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MENU

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MAY 1984

VOLUME 1, NUMBER 7

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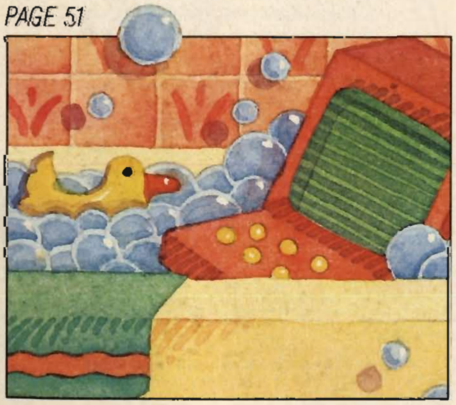

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Cover: Photo © Stan Fellerman

INSIDE STORY

In the front of every magazine, there is a long list of names and titles called a masthead. Very few people—outside of the families of the editors—ever read it. After all, who really cares who the junior assistant contributing copy checker is? Unless you're related to somebody at ENTER (Hi, mom!), you've probably never read *our* masthead, which sits next to this column. But we've just added something important. See where it says "Youth Advisors" (around the middle somewhere)? Well, those six names are all kids, and an important part of our magazine. And we need four more reader/advisors. Maybe you could be one.

The "Youth Advisor" board began when we noticed that we'd been talking to a lot of kids who were doing interesting things with computers. We found that those kids had a lot of smart things to say about computers, and about ENTER. We realized we wanted them to be a part of ENTER on a regular basis.

So we asked Bela Selendy, 16, Greg Trautman, 17, Elizabeth Disney, 13, Eric Babinet, 16, Dan Lhamon, 13, and Cynthia Elias, 13, if they would join us as advisors and contributors. We wanted to know what they thought was exciting in computers and games, and what they liked and didn't like about ENTER. We promised to hook them up to a telecomputing network, to consult with them about articles, to have them write for us, and to bring them to New York once a year.

We've been pleased with their help. They come from New York, New Hampshire, California and Connecticut. But we'd like to add four more kids, making it an even ten.

If you'd like to be part of our Youth Board, drop us a note. Tell us (1) what your experience with computers has been, (2) how you would make ENTER better, and (3) why you'd like to be on our board. Send the note in by May 15. We'll pick four kids, and tell you by June 15 if you're one of them.

Write to us at ENTER ADVISORS, ENTER, 1 Lincoln Plaza, New York, NY, 10023. We'll be looking for you!

Ira Wolfman

Ira Wolfman
Editor

enter™
VOL. 1, NO. 7, MAY 1984 © 1984

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Applied for membership, Audit Bureau of Circulations.

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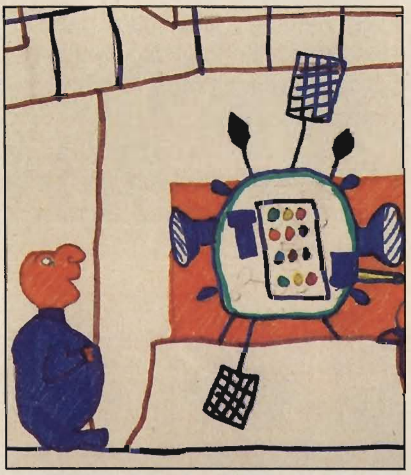
FEEDBACK

LET ME ENTER-TAIN YOU

I'd like to thank you for helping me keep my head above water when I'm around my hacker friends, and for so many hours of pure entertainment.



I'm always brimming with ideas and creative thoughts every time I finish reading your magazine. I hope that in the future you will continue to spotlight some of my fellow readers' creativity and genius as you did in "The ENTER Hal of Fame—Mean Screen Machines" contest in the February 1984 issue. —Tami Stephens, 15
Highland, CA

NAVY DISPATCH

I am in the U.S. Navy, stationed aboard the U.S.S. Midway, an aircraft carrier which is currently home-posted in Yokosura, Japan.

During my one and a half years in Japan and the Far East, I have gotten very interested in synthesizers. The models I currently own are a Roland Jupiter 6, SH-101, Drumatix and a Korg Poly 800.

I bought the Dec./Jan. '84 issue of your magazine because of the promise on the front: "Thomas Dolby, The Police and Others Make Computers Rock—And You Can, Too!" Your magazine got me started on computerizing music...

I am currently in a band on our ship, Crystal Spade, and we have several thousands of dollars worth of equipment at our disposal. While we are over here we have bought all the equipment (Japanese) for a fraction of stateside costs, and that is one reason for my wanting to "computerize" my keyboards while stationed in Japan: It's cheaper!!

—Steven M. Barlow AQ2
USS Midway (CV41)
FPO San Francisco, CA

COMMANDEERING THE COMMODORE

My family is just about to get a Commodore 64 computer. They (my family) expect me to know most everything about it, because I'm a "whiz" at the TRS-80 III. What should I do?

—Derek Pattison
Racine, WI

Dear Derek:

Sounds like a case of computer fright. Relax. There's no reason to think that if you picked up programming on the TRS-80, you won't have just as easy a time on the Commodore. Besides, the differences aren't major. Just make sure you carefully read the manual first. Before long they'll think you're a "whiz" on the Commodore, too. —Ed.

CONTEST CRAZE

In future issues, will ENTER have more contests? If you do, what will they be about? Who can enter? —Leeanne Miller
San Francisco, CA

Dear Leeanne:

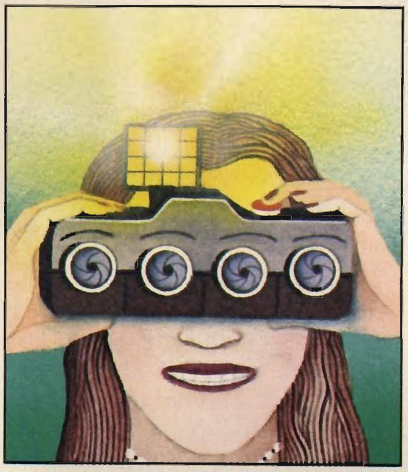
First of all, anyone *can enter ENTER contests. They'll run in about every other issue, and be as fun and challenging as we can make them. Look for our robot contest in the June '84 issue. Find the robot and it's yours!* —Ed.

WRITE TO ENTER WITH YOUR COMPUTER

There are now two ways to send electronic mail to ENTER. Last month, we told you how to contact us through The Source. Now, we can get messages from those of you who subscribe to CompuServe. Our CompuServe ID is 72456, 1776.

In case you didn't see it last issue, our ID number for The Source is BBI113. Drop us an electronic line. The next time we type GO EMAIL, we expect to see a whole disk full of messages waiting.

(Continued on page 62)



3-D SHUTTER-BUG

Here's something that will capture those special moments in life—the Nimslo 3-D camera. It takes three-dimensional photographs that stand out in a crowd.

Unlike conventional cameras, the Nimslo 3-D has *four* lenses. Each lens records a slightly different angle on your subject. These images are then combined when the film is developed. Then you've got a 3-D picture that's sure to make your friends look twice ...or even three times.

The Nimslo 3-D camera isn't only for shutter bugs. It's entirely automatic. You don't even have to focus or set shutter speeds. And the camera uses regular 35mm film; the only difference is that instead of one frame per picture, it uses two.

And with the photos you take you may occasionally be tempted to peek behind the print—just to make sure that it's really only a photograph.

■ ■ ■

DUST BUSTER

Does your computer suffer from data dust? Is your keyboard covered with accumulated dirt? Well then, Mini-Vac, Inc. of Glendale, California, may have the dust buster for you.

Dust Buster is a tiny vacuum cleaner that's powerful enough to remove dust particles from hard-to-reach areas around a computer keyboard. It comes with two vacuuming wands, two fine bristle brushes and a cloth vacuum bag. Dust Buster's versatile, too—it can also pick up pesky particles on your camera lens, or tape deck.

Still, prevention is the best solution. Keep your computer covered, and you'll probably never need worry about it turning into a dust bowl.

■ ■ ■

BASIC BLUES

Take two honky tonk singers from Delray Beach, Florida. Match 'em with a songwriter whose daughter's beau only has eyes for his TRS-80. What do you get? Well, it may not top the charts, but "BASIC Ain't the Language of Love," will certainly strike a chord with some of you.

Take these side one lyrics, for instance:

"If only we had never stopped
At that computer store.
He'd think of disks and printers less,
And love me more.
But he keeps writing programs
And tries to make 'em run.
And I'm not having any fun.
He dreams of modems and routines,
Of bits and bytes and chips and screens.
One day I'm gonna pull its plug
'Cause BASIC ain't the language of love."

Composer Felicia Scherer resolves the crisis on side two of this 45 record. Well, all's fair in love and software.

■ ■ ■

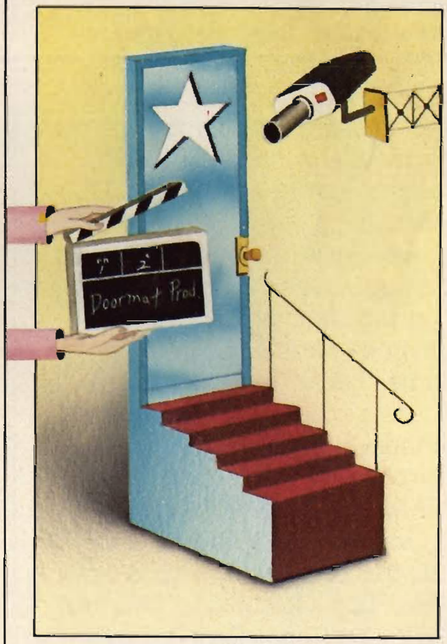
DOORWAY TO STARDOM

Tired of looking through the mail slot to see who's at the door? Well, then, turn on your TV set!

With the Video Doorbell from GBC Security of New York City, you can actually see who's at the door by tuning to a pre-set channel. The "doorbell" is really a tiny camera that attaches to the door.

"It's a toy and a security device," says GBC's Burnadette Pebbles. "Video-crazy people will love it."

But watch out for video-crazy friends who want to be TV stars. They might start singing and dancing on your doorstep.


Doormat Prod.

(Continued on page 57)

■ ■ ■

We want BITS! Win a t-shirt if we use your news. Send news items to: "Bits Editor," ENTER, 1 Lincoln Plaza, New York, N.Y. 10023.

RANDOM ACCESS

ON LINE CHIP-CHAT

BY DAVY PAYTON

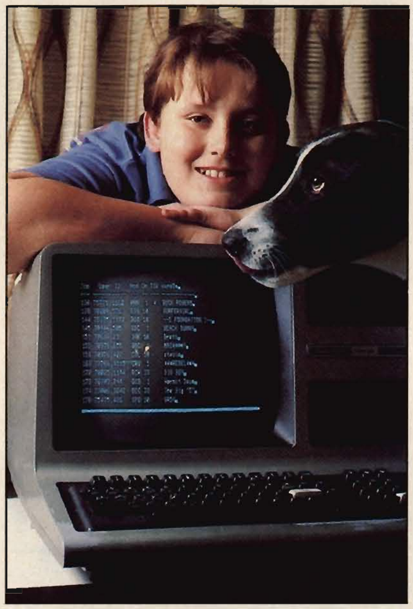
Every week I meet people from all over the country without ever leaving home. The way I do it is with a computer and a modem. I'm hooked up to the CompuServe Information Service.

CompuServe is a lot of fun. Like The Source and other mainframe services, CompuServe lets its subscribers do a lot of different things. I've played games, written to people on electronic mail and even researched a topic using the system's encyclopedia. But my favorite activity is using the CB simulator.

Just like with a regular CB radio, CompuServe's CB has channels. You can communicate with anybody who's tuned into the same channel that you're on. You talk to people by typing back. Whenever you want, you can switch to another channel and see who's there.

I made lots of friends over CB. There's LooLoo, who lives in Columbus, Ohio; Bluise, who lives in Omaha; Teddy Bear in Cleveland; Good Buddy in San Antonio; Spock in California; and Angel in Ohio.

Angel is special. She is deaf and blind and works for the Library of Congress. She has a special computer screen that makes "bumps" in Braille so that she can read messages.



© GARY T. TRUMAN

Davy is dogged about networking.

My CB name—or handle—is CompuKing, and I live in Huntington, West Virginia. Even if I lived in a big city like New York, I couldn't meet as many people from all parts of the United States as I have met and gotten to know on CB.

When I hooked up to CompuServe and started using the CB simulator, I thought: "Wow, this is a whole new world." At first I didn't know all the proper commands for getting on and changing channels. But it was easy to learn, and whenever I was really stuck, someone at the other end would help me.

The first few times you get on CB, you don't want to act like a hotshot and just butt in. You listen and say "hello" and usually people are pretty friendly—unless you're acting like a turkey. If you hang around and listen for too long without saying hello, though, it's considered rude and others on the channel will call attention to you by saying, "Hello, Lurker."

People talk about all sorts of things on CB. Most of the time, it's nothing too serious, just chitchat. We discuss the latest games and talk about new computers.

We also trade stories—like after the final day of school last year there was a lot of talk about end-of-school-year pranks.

There are different CB channels for different interests. Channel 17 is supposed to be the kids' channel, but most kids like to roam among the adults. Channel One is an adult channel, and that's where I spend a lot of my time. On CB, you *never* need to tell how old you are. And you can be yourself or your favorite character from a movie, comic strip, or a *Dungeons and Dragons* game. Once I got on CB and ran into someone with the handle Garfield. So I changed my handle to Odie and we "fought" like they do in the comic strip.

I usually tune in to CB for about three hours a week. I pop on at around eight in the evening, and see who's talking on different channels. My dad sets limits to how much time I can spend on CompuServe or I'd probably be on all night. Usually, he'll tell me to get off. Half an hour later, I'm still on. Then he'll yell, "All right, Davy, time's up." I keep typing for another half hour. Finally, he comes in and actually turns off the machine... whoops, here he is now ...gotta go. Over and out.

DAVY PAYTON is 11 years old.

BITS

ILLUSTRATIONS © SETH JABEN

SHOPPERS' DELIGHT

Ding! Dong! No, that's not Avon calling—it's Comp-U-Store.

With Comp-U-Store, you can use your home computer to shop at home. This mainframe service lets you select from over 60,000 items, including stereos, home appliances, video players, and more.

Comp-U-Store works like this: once you're connected via modem, you type in the name of the product you're interested in. The store's computer asks a variety of questions. How much are you willing to spend? What special features are you interested in? Comp-U-Store then provides a list of items with the features you want at a price you can afford. You type in the model you like, your credit card number and your address. In a week or so, your selection is delivered.

If you miss the hustle and bustle of department stores, however, never fear. A video version of Comp-U-Store is now being tested in various department stores. With this system, laser disc technology lets shoppers actually see the products before they blow their hi-tech budgets buying them.

COMPUTER BY CRAYON

Color this bit high-tech.

The New Technology Coloring Book by Rita Aero and Howard Rheingold lets you make a pixel perfect picture of all kinds of technological marvels.

You can color a DNA molecule, fill in a coded message sent into space, or add shades to the portrait of a famous physicist. You can even paint the heat patterns of the body and the heat-sensitive sections of the Space Shuttle.

The color-by-number pages can be colored with crayons, pencils, or pens. And some of the colors are filled in pixel-by-pixel. That means you color one picture point at a time—just the way a computer creates graphics on the screen.

Only we don't think the computer uses crayons.

SMELL-O-RAMA

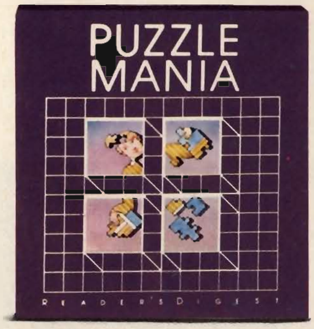
Something smells fishy around here—or is it minty? No, wait a minute, it smells more like an ocean breeze.

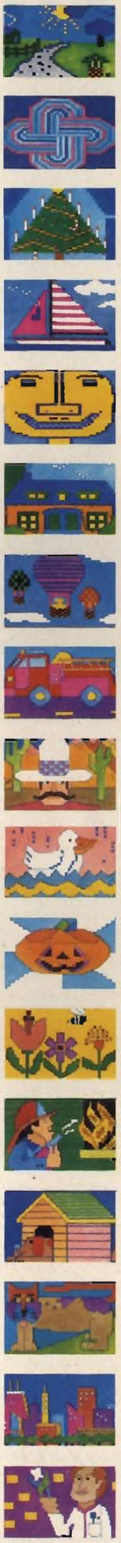
Whatever it is, you can change the aroma just by changing the disk in the Aromance Aroma Disk System.

The scents are "played" by inserting a 3½-inch record-like disk filled with selected aromatic oils into the "Fragrance Record Diffuser." This device heats the disks and releases the aroma. Standard disks last about an hour; there are also long-playing choices that last five hours or more.

The idea seems to be a hit. Two other companies, Remington Products, Inc., and Charles of the Ritz, are also making similar players. It may seem silly, but it really makes scents.

INTRODUCING PUZZLE MANIA. 7 GREAT PUZZLES CREATED BY US.
THE OTHERS BY PUZZLE MANIACS.





Puzzle Mania™ is a challenging jigsaw program for puzzle lovers.

Puzzle Mania is also an inspired jigsaw program for puzzle creators.

Because in addition to the seven great puzzles on the disk, you can create your own pictures on the screen, paint them in sixteen different colors and let the program turn them into puzzles to save on a separate disk.

Each Puzzle Mania puzzle (including your own creations) can be played on six levels of difficulty. There's help when you need it. And all turns are tallied. So you can turn the puzzle play into competitive play. If you have to part with a puzzle before it's finished, there's a stop-and-save feature built into the program, too.

Reader's Digest Software™ created Puzzle Mania for kids and their friends and their parents and their grandparents and everybody else who likes fun and games. Look for it at your software store or call Customer Service at 800/431-8800. (In NY, AK, HI: 914/241-5727.)

**SOFTWARE GOOD ENOUGH
TO GO OUT AND BUY A COMPUTER FOR.**

READER'S DIGEST

Warranty information available upon request by writing to: Reader's Digest Services, Inc., Microcomputer Software Division, Pleasantville, N.Y. 10570. Puzzle Mania runs on Apple® II, II Plus, IIe: 48K and disk drive, Commodore™ 64 Machine and disk drive. Color monitor required. IBM® PCjr version available late spring. Puzzle Mania and Reader's Digest Software are trademarks of The Reader's Digest Association, Inc. Apple is a registered trademark of Apple Computer, Inc. Commodore is a trademark of Commodore Electronics Limited. IBM is a registered trademark of International Business Machines, Inc.

ASK ENTER

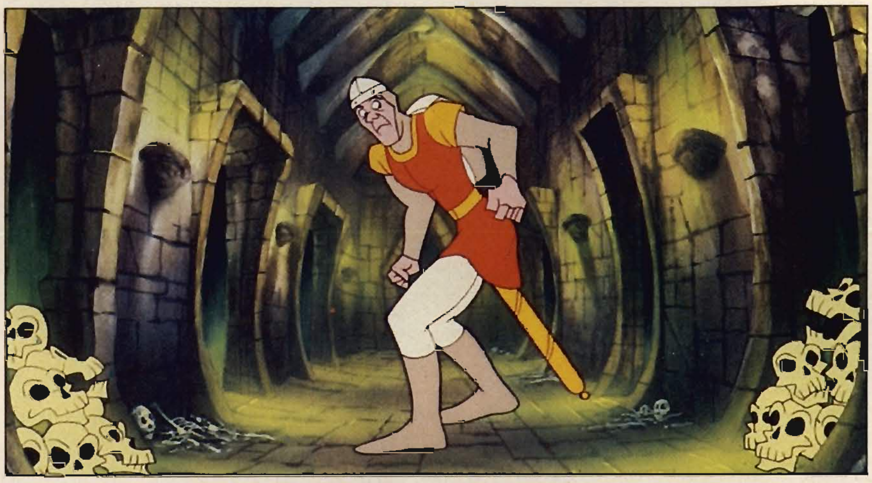
BY DAVID B. POWELL

DRAGON'S LAIR AT HOME

DEAR ENTER: I have heard that ColecoVision is buying the rights to *Dragon's Lair.* Is this so? And will you need an RCA videodisc system to play it? —Casey Horton
Fullerton, CA

DEAR CASEY: Coleco announced its home version of *Dragon's Lair* in January at the Winter Consumer Electronics Show. Sometime later this year, they promise, you will be able to play the arcade hit at home with either a ColecoVision cartridge or a datapack cassette for the Coleco Adam. A version on 5¼" diskette will also be available.

By the beginning of 1985, Coleco plans to introduce a videodisc version of the game *and* their own videodisc player for the Adam system. They haven't said yet whether it will be a laserdisc or a CED player.


COURTESY OF DON BLUTH STUDIOS

Is Dirk the Daring on his way to your house?

THE MOST RAM

DEAR ENTER: What is the highest K RAM (Random Access Memory) in a home computer?
—Michael Dougherty
Philadelphia, PA

DEAR MICHAEL: Today, most home computers come with 64K RAM. That was unheard-of only a few years ago. And many home computers come with the the ability to expand to 128K or even higher.

Which home computer can store the most information? Technically, there is no limit to the amount of central memory a computer can support. Besides, you can buy add-ons that will increase your machine's capacity. For example, the IBM PC comes with 64K and expansion slots that let you go up to 516K. Then you can buy additional expansion slots and other hardware and add even more memory.

Right now, if you want a computer that *comes with* more than 64K, you'll have to look at personal computers that were designed for business applications. The Compaq portable, for example, which is IBM-compatible, comes with 128K and is expandable to 640K.

COMPUTER LANGUAGES

DEAR ENTER: Do you know where I can get a book about the different computer languages?
—Arienne Stuefloten
San Jose, CA

DEAR ADRIENNE: The best book we know of on the subject is Volume II of *The Secret Guide to Computers* by Russ Walter. It covers over 30 programming languages and gives you side-by-side comparisons, showing what they look like. Unfortunately, you have to order this book by mail. Write to: Russ Walter, Suite #3, 92 St. Botolph Street, Boston, MA 02116. Enclose $14 for each book (MA residents, add 5% sales tax).

If you want to learn about a particular language, take a look at a series called the Alfred Handy Guides. The series includes booklets on APL, BASIC, Logo, Pascal, FORTRAN and COBOL, with descriptions and samples of programming. They are available in many bookstores, and cost about three dollars each.

If you have a question about computers, just send it to:
ASK ENTER, ENTER Magazine,
CTW, 1 Lincoln Pl., NY, NY, 10023.

USER VIEWS

PLAYING TO LEARN

BY PHIL WISWELL AND BERNIE DEKOVEN

The games people play have changed. At one time, it was enough simply to 'pong' a ball back and forth across the screen. Today, people are demanding more from their computer or VCS systems. They want to test their knowledge and learn new skills.

This issue, "User Views" looks at a cross-section of simulation, skill, music and art software. It's all software that's intended to teach and entertain you. We tried to keep those two goals in mind as we evaluated these programs. Did we learn anything? Was it enjoyable?

◆◆◆

INTELLECTUAL DECATHLON

(Muse; Apple II +, IIe; 48K disk, $39.95)

"Conceptually fine, but the program could have been better." —Bernie

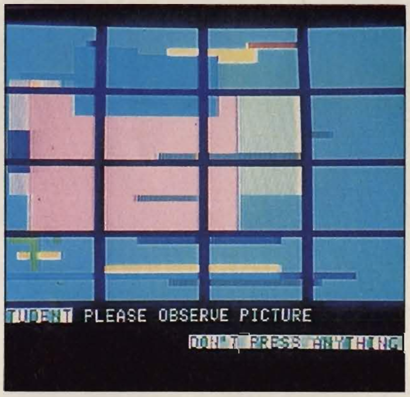
"The best mental gymnastics I've seen." —Phil

Intellectual Decathlon is a set of 10 separate games, or events that put your brain through its paces.

The games here range from "Numberstretcher," a numerical version of the memory game *Simon*, to "Instant Replay," in which players decide whether or not pictures are identical.

Our favorite game was "Abstrajig," in which you have to reconstruct an abstract picture from memory. Our least favorite was "Apple Derby," a needlessly complex horse race.

We noticed a few problems: The software seems to take a long time to load, and it's hard to jump around easily from one game to another.


TUDENT PLEASE OBSERVE PICTURE
DON'T PRESS ANYTHING

WRAP-UP

BERNIE: I thought that most of the activities were definitely classics of mental exertion.

PHIL: I loved the way these games challenged my wits. I didn't learn anything in particular, but playing this game was a lot of fun.

◆◆◆

STATES & CAPITALS

(Atari; Atari computers; cassette, $14.95)

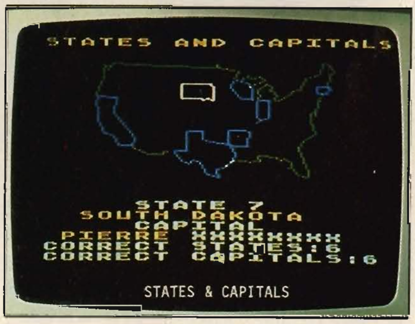
"It did a very good job of teaching me something I wanted to know." —Phil

"This is an excellent subject to learn this way." —Bernie

States and Capitals will only keep score for one player, but two or three or more can play by voting on each answer. Although its graphics and effects fall short of state-of-the-art, *States and Capitals* really works because it is challenging. You'd be surprised how many people play the game because they *think* they know all 50 states and capitals.

There's no fast-paced excitement here, but the subject holds your interest.

To begin, the computer draws an outline of the U.S. border, then selects a state at random and draws in its outline. The player types in the name of the state, and, if correct, gains one point. Then a dot appears at the location of the state capital and the player must type in that name. Players don't get a second chance, and unless the names are typed in with correct spelling, the computer will not accept them.


STATES AND CAPITALS
STATE 7
SOUTH DAKOTA
CAPITAL
PIERRE XXXXXXXX
CORRECT STATES:6
CORRECT CAPITALS:6
STATES & CAPITALS

WRAP-UP

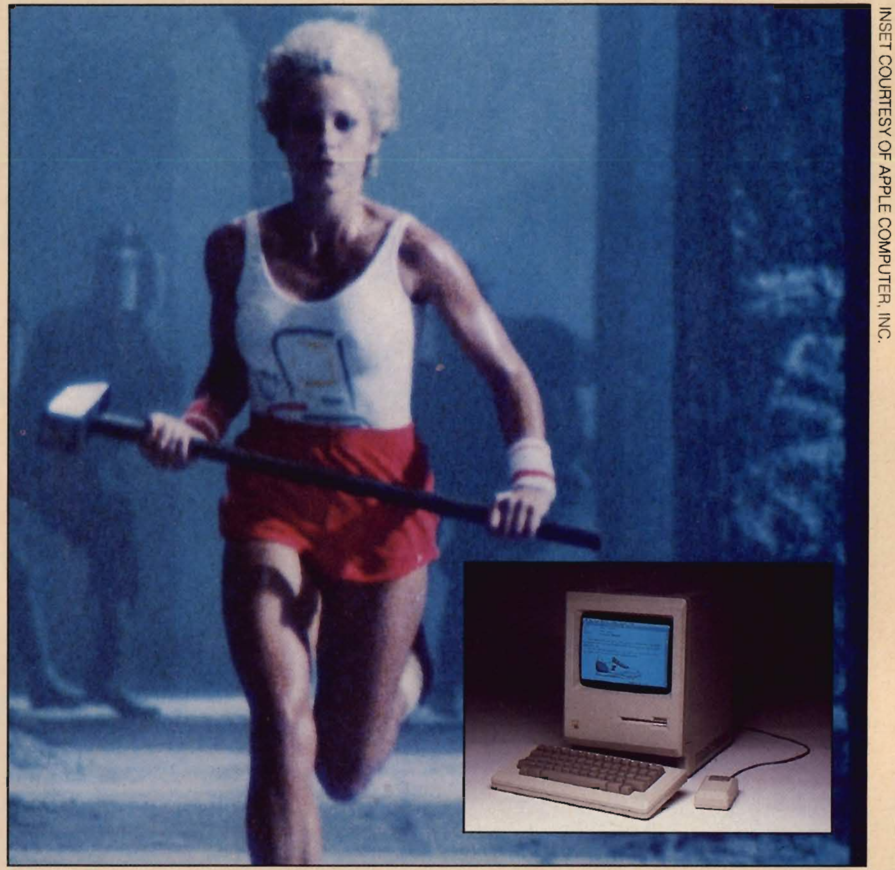
PHIL: I've stayed up nights playing this game over and over until I score 100 percent. Then I get up the next day and miss two or three!

BERNIE: Yes, but the game is three

(Continued from page 60)

NEWS BEAT

APPLE LAUNCHES MAC ATTACK


INSET COURTESY OF APPLE COMPUTER, INC.

A '1984'-ish commercial introduced Apple's Macintosh computer (inset).

The Macintosh, Apple's new 32-bit personal computer, may be the first computer ever to stand at a podium and introduce itself to the world.

That's exactly what happened in January at Apple Computer Company's annual meeting in Cupertino, California. Steven Jobs, Apple's Chairman of the Board, carried the modest-looking 20-pound Macintosh onstage, placed it on the podium and plugged it in. After that, the Macintosh—or Mac, as some call it—was on its own. As the audience watched, the Mac drew intricate pictures, generated charts, and printed a dazzling variety of type styles. It finished by using its synthesized voice to deliver a speech that brought the applauding audience to its feet.

The dramatic announcement is part of Apple's aggressive campaign to sell the Mac. That campaign includes the very unusual "1984" TV commercial (see photo), in which Apple claims "1984 doesn't have to be like 1984" because the Mac is so user-friendly.

Indeed, this computer does offer some very user-friendly features. The Mac is designed to function as an electronic desktop for office workers and students. It comes complete with built-in software that functions as electronic files, papers, pencils, scissors and paste. Like its big sister, the Lisa, Mac comes with an electronic pointer called a mouse. By pointing the mouse at pictures (or symbols) on the screen, you can get the computer to do just about anything without touching the keyboard.

The Mac also features an extremely sharp 9″ black and white monitor. Its screen has a high-resolution 175,104 pixel display. With the combination of this display quality and the available Mac Paint software, it looks like the Mac will offer graphics capabilities far beyond anything in its $2495 price range.

Other features include a 3½″ disk (most floppy disks are 5¼″), 128K RAM, and a built-in speech synthesizer. Will the Macintosh be the success that Apple is hoping for? Only time will tell. But at first glance, it looks like other computer companies better prepare for a Mac attack.

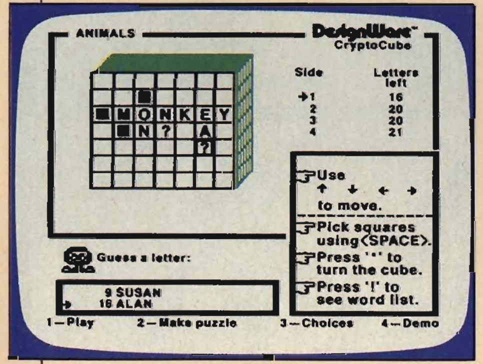
—*Susan Meyers*

DATABAR: You know those zebra-striped bar codes they put on everything from soda cans to computer magazines? Well, there's a new product that uses these codes to let you program your computer.

It's Databar Corporation's OSCAR, or Optical SCAnning Reader. You run this scanner across a page of special bar codes and a program is entered in your computer's memory.

Databar is publishing a "magazine" that will have pages of bar codes which OSCAR can translate into programs. All you have to do is wave OSCAR's scanner over the page and it will turn the black and white patterns into computer language in a fraction of the time it takes to type in a program. OSCAR should be available in stores this spring and will sell for $79.95.

CRAZY CUBE: It's a bit of Rubik's Cube and a smidgen of word scramble spun into one 3-D package. *Crypto Cube* by DesignWare is a computer hidden word puzzle with over 50 word lists. And it lets you create your own word lists to continually make new games. Each cube puzzle has six sides of hidden words. You solve some, then rotate the cube on your computer screen to read the rest.



Crypto Cube: not for squares.

Crypto Cube is available for Atari 400/800/1200XL, Commodore 64, and IBM PC.

TIMEX DROPS COMPUTERS:

Timex Corporation is leaving the home computer business. Following in the footsteps of Texas Instruments, Timex announced it is taking *all* of its computers off the market because it could not make a "reasonable profit."

The announcement came as surprise, since Timex just introduced a brand-new 64K color computer, the 2068.

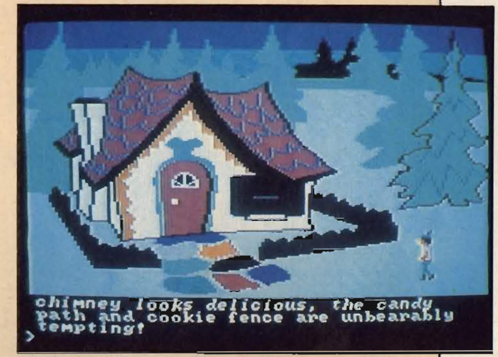
The availability of Timex software—which has never been very good—looks worse than ever. The company will continue to sell whatever it has in stock. But the company will not be manufacturing any new software.

The company will continue to honor its warranties, and offer service on its products. T/S owners can call toll-free 1-800-248-4639 for information on service and software.

ENTER will have more information for Timex owners in our next issue.

KING'S QUEST: First there was the word—and text adventure games were the most popular around. Then graphic adventure games were all the rage. Now comes *King's Quest*, the first 128K *animated* adventure game. "It's beyond state of the art," designer Roberta Williams says. "It doesn't compare with any other software because with this animation we got the machine to do something its never done before."

In *King's Quest* your animated hero, Sir Grahame, will act out the commands you type in. The goal is to have Sir Grahame find a magic chest shield and mirror. As in any adventure game, there are many obstacles to overcome. "My favorite scene is when you jump up and try to catch a huge bird by its feet," says Roberta. "Eventually the bird takes off with you and drops you." It's a moving experience. *King's Quest* is available from Sierra On-Line for the IBM PC and other computers with 128K ($49.95).



```
chimney looks delicious, the candy
path and cookie fence are unbearably
tempting!
>
```

King's Quest: a moving experience.

CAR POOL: Minnesota Fats is trading in his pool cue for a joystick—at least when he plays the *Minnesota Fats' Pool Challenge* computer game from HesWare.

"This game is different from other pool challenges because it's easier to use," says Bob Fournier of HesWare. "The game's pool balls respond just like real pool balls." The game screen shows an overhead view of a pool table. The player must maneuver the joystick and function keys to control the speed and direction of the ball.

What does Minnesota Fats say? The legendary champ makes great claims for the game that bears his name: "It's a fantastic thing. You'll be playing this game 24 hours a day!" *Minnesota Fats' Pool Challenge* is available for the Commodore 64 for $29.95. ⊏

'STARFIGHTER': HI-RES OR REAL?

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***The Last Starfighter* turns video game player Alex Rogan (played by Lance Guest, center on ramp) into an interplanetary warrior.**

When a movie company spends millions of dollars to produce the best computer graphics animation sequences ever seen, the last thing you expect the film's director to say is "We're hoping no one even notices."

But that's just the way director Nick Castle, Jr. feels about the effects in his film, ***The Last Starfighter.*** *Starfighter,* due out this summer, is the story of a boy who finds himself recruited as a top fighter in an intergalactic war. Why him? Because he's a champ at a certain arcade video game.

The story may be fun, but it's the effects that have computer fans excited. **Digital Productions** (a Los Angeles-based computer graphics company) and a Cray supercomputer are responsible for all the tech magic. Director Castle and the technicians at Digital are hoping that the high resolution graphics (representing space ships, star fields, planet terrain and even people) will be so good that you won't notice they aren't real objects.

"Nothing of this magnitude has ever been done on a computer before," claims Castle. The "photo-real" sequences will take up 20 minutes of movie time.

With the high-tech highlights Digital has in store for *Starfighter,* lead character Alex Rogan will have quite a backdrop for his adventure gaming.

"Alex is a video game whiz," explains Catherine Mary Stewart, who plays Alex's girlfriend Maggie. "It's the summer after our high school graduation. Alex is confused about the future and takes out his frustration on the game, continually trying to beat his own score. He takes it very seriously."

Does Alex (played by Lance Guest) take the *Starfighter* challenge? Does Maggie get left behind? You'll have to see the movie to find out. But rumor has it that there are enough unanswered questions at the end of *Starfighter* to leave room for a sequel. The possibilities are out of this world.

—Patricia Berry

MUSIC NOTES: By late spring, you may be able to buy a record album *and* software for your Atari computer—all in one package! English rocker **Pete Shelley** is the mastermind of this record-computer connection. Last year, his British album *XL.1* was made with a special groove in the record. You could insert your stereo needle into the groove and tape-record computer tones. Then those tones were input into a personal computer, the Sinclair ZX81. The computer would print song lyrics and graphics on its monitor as the record played on your stereo!

Pete's upcoming American album on Elektra Records is produced by **Martin Rushent,** who helped **Human League** on their first album, ***Dare.*** The computer graphics that accompany Pete's lyrics are his own.

Not surprisingly, Pete's been a hacker since 1971, when a time-sharing terminal was installed in his Manchester grade school.

"Music and computers have been playing leap frog in my life," says Pete. "But in the last three years—since I bought my own computer—I've been able to combine the two disciplines." And someday soon, Americans may get a chance to hear—and see—how.

THEATER TRENDS: Take Renaissance artist/inventor/philosopher Leonardo da Vinci, give him a vocoder and a computer and put him in real-time. What do you get? Playwright Kenneth Robins calls it ***Lenny and the Heartbreakers,*** a musical that gave us a hint of what theater might be like in the not-so-distant future. Very loosely based on the life of the great da Vinci, the play/opera ran for a few weeks in a New York City theater last winter. It combined digitized backdrops of *Mona Lisa* and *The Last Supper* with a completely synthesized musical score. Some critics raved; others raged. But none could deny it was a theater tech high. Could this be the shape of theater to come?

© MARTHA SWOPE

Lenny: **Theater goes high-tech.**

MOVIE NEWS: What happens when a computer that's programmed to write love poetry for its owner's girlfriend starts to fancy the woman, too? The results aren't exactly user-friendly! MGM/UA's light-hearted movie ***Electric Dreams*** puts this love triangle on-line. Providing the film with digitized, and no doubt danceable, musical interludes will be **Boy George** and **Culture Club** and the **Electric Light Orchestra.** Music Video director Steve Barron will make his feature film debut with this movie, due out this fall.... Ten years after Discovery I astronaut David Bowman is lost in space near Jupiter, a rescue mission is sent to find him. But will the Russians get there first? That's the plot of ***2010: Odyssey Two,*** the sequel to 1968's classic computer/ science fiction film ***2001: A Space Odyssey.*** Filming has already begun on this **Arthur C. Clarke** space adventure, which stars John Lithgow (*Twilight Zone*) and Roy Scheider (*Jaws, Blue Thunder*). Heading the special effects crew is **Richard Edlund,** who also worked on ***Return of the Jedi*** and ***Star Wars.*** Look for ***2010*** next Christmas.

BEAT BIT: It's called a drum synth, a beat box, and a drum machine, but the common denominator is that this electronic rhythm-maker —the **LinnDrum** machine —gets its original drum sound from a real drummer. Studio musician **Steve Gadd,** who has played on albums for **Carly Simon** and **Steely Dan,** is the drummer who created the original rhythm for the LinnDrum. Steve set the beat for the Linn's 16 "voices," including cymbals, snares and basses. Can you beat that?

CELEBRITY BITS: The arresting lead singer of **The Police,** Sting, has been a very busy bee. Besides touring with his band, Sting spent summer vacation playing the villain Feyd in ***Dune,*** the film adaptation of the best-selling science fiction novel of all time. And during another concert break, he was off to California to create a computerized symphony.... When the cute but raspy-voiced alien star of ***E.T.*** spoke, Elliot and just about everyone else listened. But did you recognize the voice? Probably not. The fact is, director **Steven Spielberg** called on the help of his pal, cute but raspy-voiced actress **Debra Winger,** to dub in such famous lines as "E.T. phone home" and "Ell-i-ot." Debra's and another voice were electronically mixed together for the final take. Debra's favorite line? "Owww-ch."

Costumed for *Dune,* Sting alternates rocking role with acting.

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ELECTRONIC ELEMENT: **Earth, Wind and Fire**—known for 10 years as a heavily orchestrated rhythm and blues band—has abandoned brass horns and stringed instruments for synthesizers and drum machines. Their new LP on Columbia records, ***Electric Universe,*** is the highest in high-tech music. Says bandleader Maurice White: "Music is a reflection of the computer age we live in." When in Silicon Valley, swing with the microchips.

ELECTRONIC ENTREPRENEURS

© RICK BROWNE/PICTURE GROUP

Adam, Mark and Chris in the garage where they invented an IBM-PC part.

Eighteen-year-old Mark Juliana and his neighbors Adam Hogin , 17, and Chris Hogin , 14, were just looking for a way to upgrade the memory on Mark's family IBM-PC. But when they got to work, these three San Jose, California, hackers realized that they had created a marketable product. "We thought, 'Wow, if what we've developed is so useful to us, then other PC owners will be interested in it, too,'" Mark remembers.

Mark, Adam and Chris call their invention the "Expansion Kit." It enables IBM-PC owners to add extra memory and peripherals to their computers by doubling the number of expansion slots on the PC. (*Expansion slots* are the places where components like the disk drive, monitor, printer, game controllers and extra memory plug in.)

The boys formed a company to sell their product, and named it TAMAC (*T*he *A*dam *M*ark *a*nd *C*hris) Electronics. TAMAC operates out of Mark's garage in San Jose. The teenagers buy all their parts wholesale from manufacturers. "At first, it was kind of funny because manufacturers were real curious," Mark recalls. "They just couldn't understand why three kids would want all these parts. They still always make us pay up before they'll fill our order. I guess since we're young, they're afraid we might not have the money."

Once all the components are gathered, the boys assemble the kits. "Each one takes about 10 minutes," says Mark. "We usually work together and produce a lot at one time, then stock them. We keep track of our inventory, expenses and profits on my family's IBM."

The Expansion Kit costs $14.95 and is sold mostly by mail order. "It's about a 45 percent profit for us," Mark notes. "So far as we know, everybody has been happy with it." The only error they've heard of was a typo in the instruction manual. "That's been corrected."

TAMAC has sold around 1000 kits so far—a slight disappointment, because, explains Mark, "We thought we'd be living off our capital by now. I mean, we expected to make at least our first half a million." But Mark, Adam and Chris are optimistic: "We've only just begun — we're working on new inventions right now."

•••

Leader of the NAK

Peter Fishman, 14, is president of an Apple Users Group that's especially for kids. It's called Newton Apple Kids (NAK) and it boasts more than 100 members, most of whom are under the age of 18.

This spring, under Peter's guidance, NAK will be incorporated under the new title of Computer Kids Incorporated.

Peter has high expectations for the group: "We're hoping to have chapters all over the country," he says. "In addition to the Newton Apple Kids here in Massachusetts, we already know that there will be a Syracuse Apple Users Group in New York, and one in Texas. It's very exciting."

Peter and his fellow club members have also been working on a NAK electronic bulletin board. It will be called The sNAK Bar and should be underway by April. "We're interested in reaching outside the club," says Peter, "and the sNAK Bar is one way to do that. It will be open 7-9:00 most evenings and anyone with a modem can post messages."

Joystick Executive

Tammy Sue Stewart's hand was the inspiration for a new product called the Video-Rack—a plastic joystick holder that's designed to give your hand support during long hours of playing. Now the 14-year-old from Le Center, Minnesota, is president of the company that makes the Video Rack. The company even bears her name, Tammy Sue Distributors.

Tammy Sue gives her Dad most of the credit for the Video Rack. It was his invention, she says. But it was her tired hands that gave him the idea: "We had just gotten an Atari computer and Dad noticed that after we'd been playing lots of games, we were always rubbing the hand that held the joystick."

So far, Tammy Sue Distributing has received orders from stores all over the country. "We charge $10.95 for each one and make about $3 on each sale," says the company president.

We'd say she's got quite a rack-et.

The Hacker Actor of 'Whiz Kids'

Did you know that Jeffrey Jacquet, who plays Jeremy in CBS's *Whiz Kids*, is a real-life hacker? Well, he is, and he's currently co-writing an adventure game that he hopes to be able to show computer companies by summertime.

PHOTO COURTESY OF CBS

Jeffrey Jacquet: life imitates art.

"So far," says Jeffrey, 17, "the game revolves too much around luck. We need to make it more of a game of skill. Once that bug's out, we'll be ready to go."

Jeffrey's role in *Whiz Kids* played a major part in converting him into the real-life hacker he is today. "As soon as I started preparing for the part, I just wanted to go into more depth with computers." Now he finds that they play a big role in his life: "There's always something new that you can do on a computer. I write all sorts of programs, I never have a chance to be bored anymore."

Video Pro

Tim Collum of Boyt, Texas, is 1983's "Video Player of the Year." The 21-year-old was crowned champ on January 14th by the Twin Galaxies International Scoreboard of Ottumwa, Iowa, a service that keeps track of the world's highest video game scores. Tim's prizes included $250 cash and what's described as a "designer video game player uniform."

Tim says that it's not the money that makes winning the "Player of the Year" award special to him. "It's being the best. That's what I was really working for, and it's paid off."

NIBBLES: ...Junior Maestro Zoe Mulford has written an entire computerized symphony! The 15-year-old from Delaware used a $70,000 Synclavier II synthesizer to write her masterpiece, entitled "Uncommon Times."...Ever play Human Engineering Software's home video game *"Attack of the Mutant Camels"*? Fourteen-year-old Soren Kaplan played and won. His score of 117,522 got him a free trip for two to the Camelback Resort in Arizona....

Are You a Pacesetter?

Every month, ENTER's "Pacesetters" will look at kids who are doing exciting things with computers or high technology. If you—or anyone you know—are doing something interesting with computers, robots, lasers, holography, or any other high-tech field, tell us about it. Write a couple of paragraphs describing the project. Include *your* name, address and phone number (and a photo, if appropriate), and send it to: Pacesetters, ENTER, 1 Lincoln Plaza, New York, NY 10023. If we write up your story, we'll send you an ENTER t-shirt. E

CONNECTIONS

Apple Source

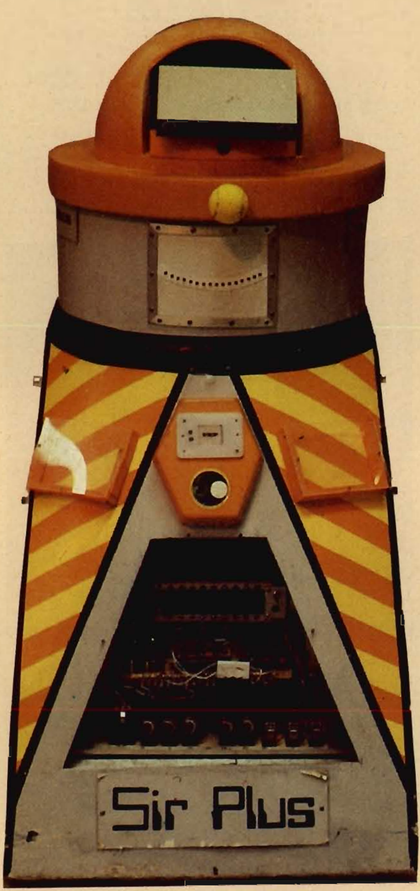
If you're a regular user of an Apple computer, you should know about the Apple Computer Clubs. These clubs can hook you up with a local Apple user group or help you start your own. They can even link you up with Apple Users in 19 countries!

While Apple clubs can be of interest to home users, they are mainly aimed at school groups. If you're using an Apple at school and there's no group there, you might want to suggest starting one. The Apple Computer Club's central office will sell your group an organization kit to help you get started. The kit contains a slew of information, including a hefty manual, posters and booklets.

The manual gives tips on club organization, lists helpful articles and books, and offers fund-raising suggestions. It also provides interesting stories about people doing unusual things with their Apples...like the Illinois man who uses his Apple to control a lawn-mowing robot.

For more information about Apple Computer Clubs, write them at P.O. Box 948, Lowell, MA 01853. You can also call (617) 459-7181.

Calling All Robot Builders



Sir Plus, the leftover robot.

COURTESY OF SCIENCE MUSEUM, WEST PALM BEACH, FLA

Is your ambition in life to be a world-famous robot builder? Then we've got the perfect showcase for you. The First National Robotics Championship Contest will take place on June 15 and 16 at the Science Museum and Planetarium of Palm Beach County, Florida. The contest is open to all high school students (junior high is fine, too), and prizes of over $1000 will be awarded in three categories.

Robots of all sizes, shapes and abilities are eligible. "Judging will be based on originality of design, quality of workmanship, and esthetics," the museum says.

The contest will be hosted by the science museum's recycled robot, Sir Plus. To be eligible for the contest, you *must* register by June 1, 1984. (There is a deposit of $25—which will be refunded—required.) For more information, write: Science Museum and Planetarium, 4801 Dreher Trail North, W. Palm Beach, FL. 33405.

Commodore Software

You've got a Commodore computer and you're tired of spending a lot of money to get a decent mixture of software. Well, take heart. "Public Domain, Inc." is a software library service written *by* Commodore users *for* Commodore users. For only $10, you can get a disk or tape that contains 35 to 45 programs.

Extensive collections of software are available for the VIC-20, Commodore 64 and PET. Each collection includes a bundle of games and educational programs.

To start, send for the free Public Domain Catalogue. This booklet, which has the tiniest print we've ever seen, lists hundreds of programs. Depending on your Commodore system, you can choose disks containing *Eliza,* an electronic shrink program; *Marblestat,* a random probability demo; *Jotto,* a *Mastermind*-type word game; and *Niche,* in which you control ecological variables.

For more information, or a copy of the catalogue, write to Public Domain, Inc., 5025 S. Rangeline Rd., West Milton, OH., 45383, or call 513/698-5638 (The call is *not* free).

—Susan Jarrell

To list news, contests or resources in "Connections," send them to: Listings, ENTER, 1 Lincoln Pl., New York, NY 10023.

GENIUS AT WORK

Boot up a brainstorm.

You're going to need all your cunning and intelligence to stop the FuzzBomb from turning the U.S.A. into a nation of fuzzbodies.

You're Agent U.S.A.,™ top investigator for the country's most elite intelligence organization. And now you've been assigned your toughest and most dangerous mission ever: stopping the evil FuzzBomb from turning every man, woman and child into helpless fuzzbodies.

Quick reflexes and sharp eyes are not nearly enough here. As you race around the country on super-fast rocket trains, you'll need all your smarts to outwit the devious plague spreader. But watch out! One wrong move and you're just another fuzzbody.

And once you've tested your mettle against the FuzzBomb, you'll be ready for more mind-stretching Wizware.™

Bannercatch.™

In a remote field bigger than any field you can imagine, you and a friend team up to take on chief robot Max and his crack robot raiders. Infiltrate their territory and grab their flag before they grab yours. It may sound simple, but your strategy better be good. Max has lots of surprises in store for you.

Spelldiver.™

You're a scuba diver on a secret assignment. You must find and decipher giant words hidden deep beneath the sea. But to succeed you have to outmaneuver ferocious sharks and pesky flipper-nippers that are out to stop you.

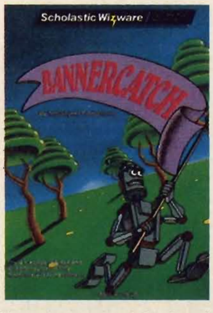
So get ready for challenge and excitement. Boot up Wizware and let the brainstorm begin.

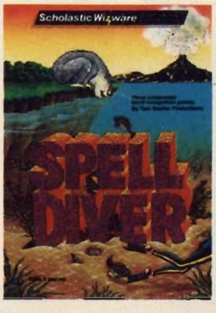
Look for Scholastic Wizware at your local computer store. Or contact Scholastic Inc., 730 Broadway, New York, NY 10003, 212-505-3000.

For a free red-and-white "Boot Up a Brainstorm" T-shirt, send your name, address, shirt size and computer brand to "Boot Up" c/o Scholastic at the above address. Enclose $2.00 for shipping and handling.

Scholastic™
Wizware

Scholastic Wizware
AGENT USA





Agent U.S.A., Bannercatch, Spelldiver designed and developed by Tom Snyder Productions, Inc. Available for Atari and Commodore 64 computers. Apple and IBM versions available soon.

HOW TO SUCCEED IN BUSINESS...

...WITH A LITTLE HELP FROM YOUR COMPUTER

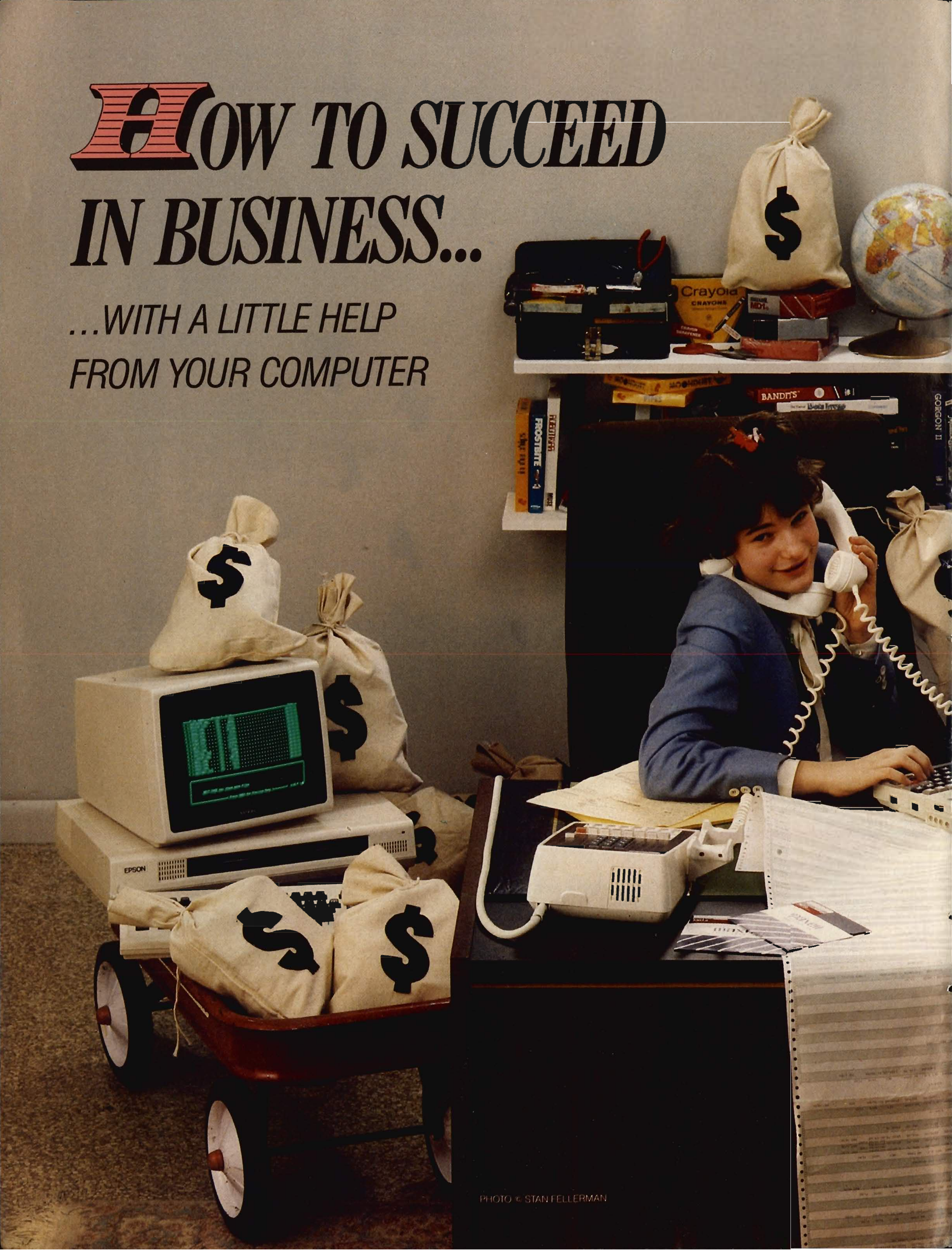

$
Crayola
CRAYONS
BANDITS
FROSTBITE
GORGON II
EPSON

PHOTO © STAN FELLERMAN

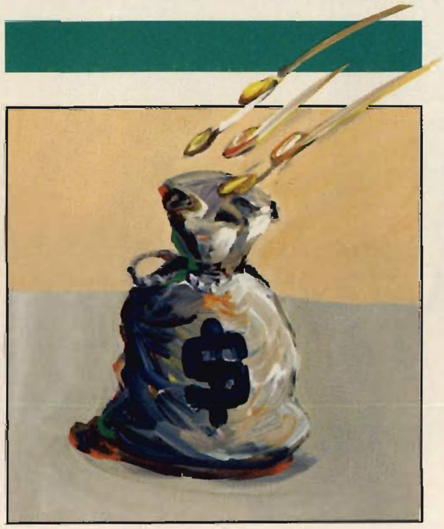
Making money with your computer is more than just a job—it's a way to earn and learn at the same time. And whether you've worked with the computer for a while, or have just gotten started, there are computer jobs out there that can pay off with money *and* experience.

We know it's hard work getting almost any summer, or after-school job. So ENTER has searched the country for money-making job ideas. Some require more computer knowledge than others, but many of the jobs can be handled by even the novice computer user. On the next three pages, you'll find a "Hacker's Dozen" of job ideas. All of them are based on the real-life experiences of teenagers who've had hands-on success building both computer know-how and their bank accounts.

We've taken a hard look at what you need to make money with your computer. But we know that you'll probably think of many other ways that you can use a computer to earn extra money. We'd love to hear your ideas and share them with other readers. Write to "Earn & Learn," ENTER, 1 Lincoln Plaza, N.Y., NY 10023.

ILLUSTRATIONS © TOM CHRISTOPHER

Bookkeeping for a belly dancer? Creating unicorns for a computer company? There's no limit to what a computer job can be.



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TUTORING

Tutoring can be a great way to earn money. Jerremy Holland, 17, works with the Texas Instrument Learning Center in San Francisco, California. He has tutored students, adults and users groups, and will work with about 2000 computer campers this summer. "Jerremy knows more about technical questions than anyone else," says Sioux Thompson, Jerremy's supervisor at Learning Center. "We send people to him when they have complicated questions."

2

WORD PROCESSING

Typing reports, papers and resumes was a way to make extra cash even before computers were invented. A word processing program, a good printer and some fast fingers add a new dimension to this time-tested job. You still have to enter the information, but most word processing programs let you make changes and corrections at the touch of a button. Chris Thatcher, 14, worked for her junior high school in Palo Alto, California. She worked at home, word processing schedules and letters for a $3.50 an hour fee. Recently she even got paid to type her neighbor's diary.

3

CLERICAL JOBS

Working in a stock room or filing papers for a company that uses computers may not sound glamorous. But these clerical jobs are often a good way to get started. Craig and Keith Mortensen, 17-year-old California twins (featured in our February, 1984, cover story) began their computer careers three years ago at the Apple Education Foundation. They did data entry, typed letters, and occasionally set up hardware. "The job had a lot of advantages," said Keith. "We met important people, had flexible hours, and got paid pretty well."

"The worst part," Craig remembers, "was that my fingers hurt from all that typing."

Before long, the Mortensen's computer graphic abilities came to the company's attention. Now, they're computer graphic consultants to Apple and other computer companies.

4

MAILING LISTS

When Leland Levy needed a computer assistant for the Palo Alto city councilman race, he turned to his 17-year-old son, Jonathan. Jonathan used his programming knowledge to help organize an electronic mailing list so his father could pinpoint specific groups of interested voters. Jonathan's program also helped organize information about phone numbers, addresses, and voters' special concerns. Jonathan and his dad are both pleased with their partnership. "My father was getting ideas in the middle of the night," says Jonathan. "So it was easy for us to run downstairs and add more information in our Apple II."

5

USERS GUIDE

If you've been working with computers for a while, you might try writing a user guide. Stephen Cohen, 16, of Denver, Colorado, was one of the first students in his school to learn FORTH, a powerful computer language that's not as widely used as BASIC. "I found that all the books on FORTH were either too hard or too easy so I wrote my own," explains Stephen. Not only is his 108-page manual the textbook for his class, but Atari says they are "very inter-

You really don't have to be a computer pro to make extra money with your computer....Even new users are finding ways to earn.

ested" in publishing it. If his manual is published, Stephen will receive royalties based on the number of copies sold. "At times it was a pain to write," says Stephen, "but I'm glad I did it."

6

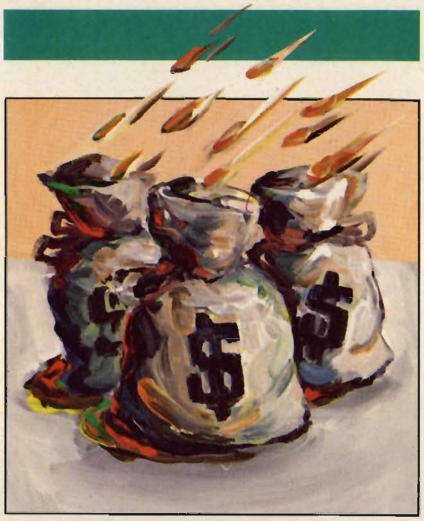
BOOKKEEPING/ACCOUNTING

Sometimes the best ways to make money with computers can sound pretty strange. "When I was in high school I did bookkeeping for a belly dancer," laughs Lisa Van Stone, now a senior at Princeton University. "I just thought of the belly dancer like I would any other client."

Lisa also wrote software that kept track of financial records for business clients. She even did a bookkeeping program for her mother. Writing this kind of software program "is one of the most useful ways to make money," says Lisa. "Anytime you pick up business skills, they'll be useful to you later."

7

COMPUTER GRAPHICS



Even if you've just started programming, you have probably tried "painting pictures" at the computer keyboard. Once you've been at this for a while, you might be able to interest local companies or stores in your work. They might need a clever computer-created picture to include in a slide presentation, or a pixel-perfect logo for their advertising.

Cori Grimm has had success with her computer artwork. This 14-year-old Californian from "Silicon Valley" has sold many of her creations to The Learning Company, a maker of educational software. Cori's unicorns, monsters, and skeletons have appeared in such games as *Magic Spells* and *Moptown.*

8

CONTESTS

And the winner is...Tim Huckabay. While Tim and other contest entrants can't always count on winning, programming contests can be a rewarding challenge. Tim, for example, has won prizes in the Denver Public School Programming Contest and in the Colorado State University Math Day Mathesis Competition. Right now, this 18-year-old is waiting to hear from the National Westinghouse Competition where he has the chance to win a college scholarship. "I enter these contests for fun," says Tim, "but you do have a chance to make money." Check ENTER's *Connections* column for news about other contests.

9

TESTING

Paul Hook, 17, of San Rafael, California, makes his extra spending money as a tester for the Broderbund Software Company. "I look for programming bugs like errors in character movement and misspelled words," says Paul. Broderbund hires testers who are 14 or older and "really into gaming." These testers rate programs on their overall value, graphic quality and creativity.

Don't expect testing to be all fun and games. Depending on the complexity of the software, testers work daily on a program for three hours over one to two weeks. It can be exhausting. "Some days," says Paul, "I'm so tired because there is so much to do."

10

WRITING

Just about everybody wants to read about what's hot in new technology. Articles that include programming tips, software and hardware reviews

To begin your own search for a computer job, learn all you can about the company or store where you want to work.

and other new tech news are very popular. You probably won't sell an article to a major newspaper right away, but you can get started by writing for your school newspaper. Once you've shown you have the "write stuff," weekly and perhaps even daily newspapers just might be interested in printing your efforts.

Vid Kid writer Rawson Stovall, 11, started small when he began writing a column for the *Abilene* (Texas) *Reporter News* in 1981. Today, his syndicated column of news and reviews appears in about 100 newspapers across the country.

11

PROGRAMMING

Although programming is very difficult to do well, it's one of the most common computer jobs. Norman Efroymson, 19, of New York, wrote a TRS-80 program to teach Hebrew. His program is now being used at the Institution for Computers in Jewish Life.

Programming can start at home. Stephen Cohen, 16, the creator of the FORTH manual, also got paid by his mother to write a stock market program. His mother enters data from the *Wall Street Journal* and the software organizes the information. "Every time I remind my mother how much money she has made with the software," says Stephen, "She reminds me that the software just organizes data—she's still got to do all the analyzing."

12

TROUBLESHOOTING

Know of a company with hardware hassles?

Chuck Tucker did. Chuck, 18, of Denver, Colorado, was a troubleshooter for Atari on their PASCAL system. The system was very user-unfriendly at first, Chuck explains. So he used his computer skills to simplify the system's editor, compiler and driver.

Chuck began developing these skills while he was still in junior high school. He started by writing programs that organized data for a nearby medical center.

HOW TO GET STARTED

Whether you're helping one person set up a computerized filing system or teaching other students how to use their computers, your job hunt is likely to begin in what may seem an unlikely place—at your local library.

If you'd like to work with a company or a store that uses computers, check the reference section of the library for resources like *Data Sources: Hardware/ Software* (published quarterly by Ziff-Davis) and the *Encyclopedia of Information Systems and Services* (Gale Books, 1982).

You can also check the Yellow Pages of your telephone book. These sources provide phone numbers and addresses of computer-related companies, some of which may be located in your area. Once you've got that information, call or write to the company's personnel or community relations office. Find out if they offer internships or have specific summer or after-school jobs for young people. (For more information about computer store jobs, see the following story.)

While letters and phone calls can work, meeting people face-to-face is the best way to land a computer job. As a young person, you might have difficulty getting an interview. But if computer conferences or career day fairs are being held in your area, you will probably be able to meet people there who can tell you about possible internships or part-time job possibilities. Keep an eye on conference announcements in computer magazines and career day listing in your school's guidance office or on the bulletin board.

And remember, keep trying and you can land that computer job. Good luck!

Material for this piece contributed by JoAnn Greco, Susan Jarrell, Dawn Gordon and Ron Legro.

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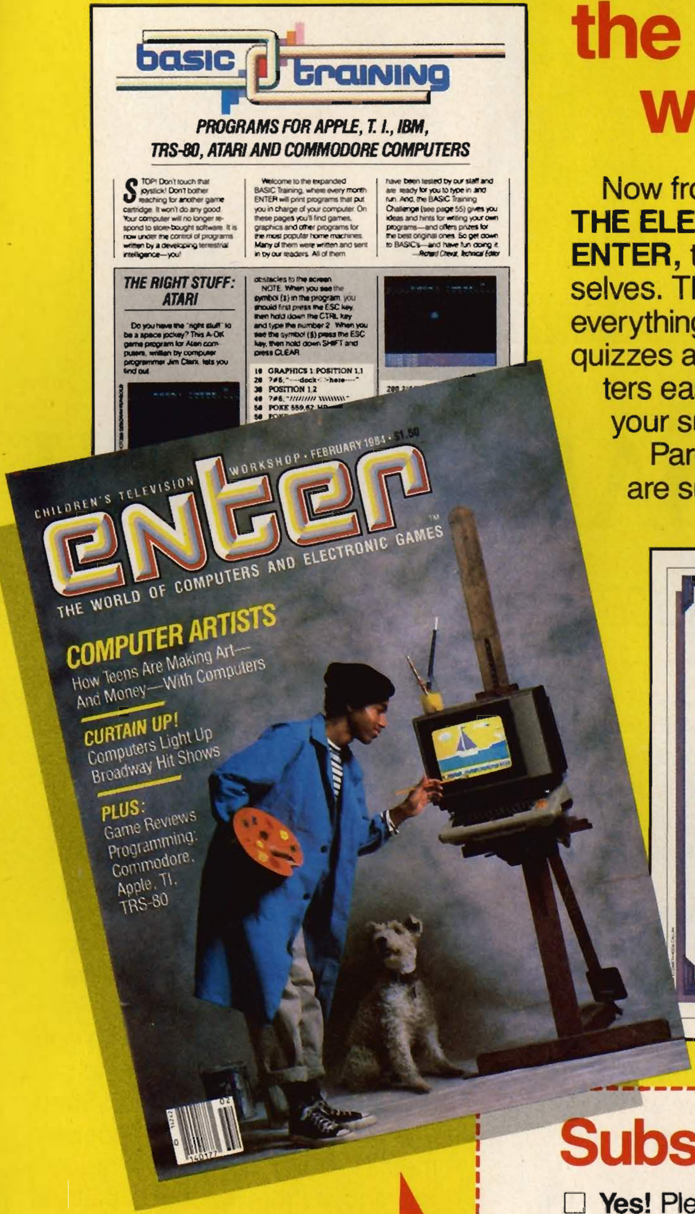

basic training

PROGRAMS FOR APPLE, T. I., IBM, TRS-80, ATARI AND COMMODORE COMPUTERS

STOP! Don't touch that joystick! Don't bother reaching for another game cartridge. It won't do any good. Your computer will no longer respond to store-bought software. It is now under the control of programs written by a developing terrestrial intelligence—you!

Welcome to the expanded BASIC Training, where every month ENTER will print programs that put you in charge of your computer. On these pages you'll find games, graphics and other programs for the most popular home machines. Many of them were written and sent in by our readers. All of them have been tested by our staff and are ready for you to type in and run. And, the BASIC Training Challenge (see page 55) gives you ideas and hints for writing your own programs—and offers prizes for the best original ones. So get down to BASIC's—and have fun doing it.

—Richard Chevat, Technical Editor

THE RIGHT STUFF: ATARI

Do you have the "right stuff" to be a space jockey? This A-OK game program for Atari computers, written by computer programmer Jim Clark, lets you find out.

obstacles to the screen.

NOTE: When you see the symbol (‡) in the program, you should first press the ESC key, then hold down the CTRL key and type the number 2. When you see the symbol (§) press the ESC key, then hold down SHIFT and press CLEAR.

```
10 GRAPHICS 1:POSITION 1,1
20 ?#6;"----dock<>here----"
30 POSITION 1,2
40 ?#6;"//////// \\\\\\\\"
50 POKE 559,62:HP
```

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Parents will love **ENTER** too. It'll explain why computers are such an important part of everyone's future.

COMPUTER CAMPS

GETTING THE BUGS OUT OF YOUR SUMMER SELECTION

BY ELIZABETH HETTICH

Summertime seems a long way off, but kids all over the country are already busy making their summer plans. Many of them are getting ready to take part in the latest summer fad—computer camp.

A few years ago, everyone wanted to be a tennis pro, and tennis camps were the fad. Now, computer programmers are heroes, and computer camps are very "in." But just as you didn't need to go to a fancy tennis camp to improve your game, you don't have to go to computer camp to learn about bits and bytes this summer.

"Computer camps certainly aren't the only, or even necessarily the best, way to learn about computers," says James Finkelstein, director of "Summer Tech 83," a computer program held in Columbus, Ohio, last year.

Sleep-away camps may cost as much as $900 for a two-week session, but there are many lower-priced alternatives. More and more schools, colleges, computer clubs and Y.M.C.A.s are offering classes, workshops and day-camps that are educational—and fun—at as little as 1/10th the price of sleep-away camp.

What can you expect to get for your money, wherever you go? "That really depends on how much you're willing to put into it," says Greg Trautman, 17, who was a counselor at Computer Camps International last summer. "You're not going to learn just by being there, but if you want to learn a lot, you will."

Much of what you're going to learn depends on your level of computer savvy before you go to camp. If you're a beginner, you might learn how to program in BASIC, write simple games and make graphics. More advanced students will learn complex languages and programming techniques. One thing is for sure: if you're enthusiastic, you're going to learn a lot. "After all," says camper Linda Hermann, 13, "when you're spending at least four hours a day programming or in a classroom learning to program, it would be very hard not to learn."

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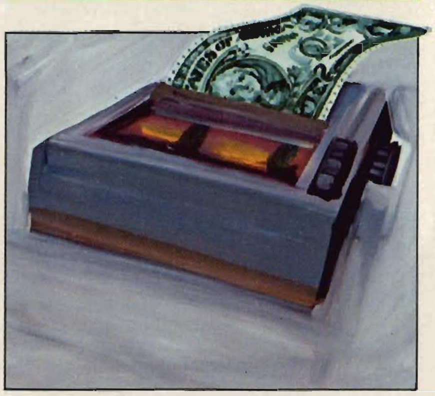
4 HEM 6

Computer stores have become the "hangout of the '80s," says one store owner. Everybody wants to be around what's hot and new.



COMPUTER SALES PITCH

HOW TO GET—AND KEEP—A JOB IN A COMPUTER STORE

Imagine being surrounded by computers. Keyboards to the right of you, monitors to the left, software stacked against each wall and peripherals on every side. No, this isn't a dream. You've just entered...the computer store.

The idea of being surrounded by the very latest computer equipment attracts many people to these stores. "They have become the hangout of the '80s," says Allan Unger, manager of the Computers Unlimited store in Milwaukee, Wisconsin.

It's not surprising, then, that many young job seekers hope to be hired for after school or summer work at their local computer store. But with all the competition, it can be tough to land one of these jobs. To help, ENTER talked with people from around the country who run computer stores, and with young computer store workers. We asked about their experiences and picked up tips on how to get—and keep—that computer store job.

How much do you have to know about computers to work in a computer store?

You don't have to know everything about every machine, according to Sandy Meyerson, owner of the Softbyte Solutions store in Ormond, Florida. But you have to be willing to learn.

"Exposure to computers and knowledge about what they can do is important," says Sandy. But you don't have to be a round-the-clock hacker, she stresses. You can learn a lot about computer systems by reading magazines and books, working on computers at home and school, and talking with people who already work in computer stores.

"I used to show up [at the local computer store] every day after school and talk with the sales people," says 15-year-old Jonathan Teller of New York City. His interest paid off. When a job came open, Jonathan was hired.

Besides computer knowledge, what else do computer stores want from their sales people?

"We look for people who are good with customers, and who try to be helpful," says Sue Duchak of Sears. Sears, which has computer departments in many of its stores, requires references (from teachers, relatives or others) and conducts personal interviews with all applicants.

Through these interviews and references, Sears tries to determine whether the applicant can deal with tough situations, says Duchak. When six customers are asking nine questions about four different machines, store owners want to know their sales people are up to this

ILLUSTRATIONS © TOM CHRISTOPHER

You don't have to know everything about every computer to work in a computer store...But you do have to be willing to learn.

difficult challenge.

"Responsibility is also important," according to Chuck Brody, assistant manager of the Program Store in Falls Church, Virginia. "We look for people who want to sell and who want to keep the store looking good," says Brody. And, of course, store owners want workers who show up on time and ready to work.

What does it take to be a good sales person?

Knowing how well software and hardware work is very important, says Tom Pearl, 17, who works at the Program Store in Washington, D.C. But, he adds, you have to give customers something more: "Successful sales people are ones who tell the truth to customers. If a program doesn't work well, tell them. It's important to form a lasting relationship," he explains. "Customers appreciate honesty and they'll come back again."

"Patience is also very important," says Sandy Meyerson of Softbyte Solutions. After the computer is sold, she points out, it's important that sales people are willing to help new computer owners get started.

Any good sales person must be able to *ask* as well as answer questions, says 16-year-old Todd Weiner. Todd, who works at the World of Computers in Port Chester, New York, says you have to ask questions to figure out what people want from their computer.

Not every computer is right for everybody, he explains. "What I do, basically, is help people select the computer system [and software] that best fits their needs."

What are the advantages and disadvantages to being a young computer sales person?

Being young can give you a special advantage when selling to young customers. Since a lot of purchases are made by teenagers, it really can help.

"The kids relate to me because I understand what they want," says Jonathan Teller. "I've used most of the software they're interested in."

But Todd Weiner and others admit that being young can also have its drawbacks—particularly when you're trying to sell expensive hardware to an older person.

"Business systems can end up costing thousands of dollars," says Todd. "Some people just feel more comfortable with someone closer to their own age."

Customers aren't the only ones who may be put off by young sales people. Older store workers may have trouble accepting you at first.

"Half of the salesmen liked me and thought I was doing well," says Brett Schulte, 15, who worked at a computer store in Wisconsin. "The other half resented me because I was so young."

To avoid these problems, some computer stores have established strict age limits for employees. The Program Store, for example, insists that all its workers are at least 16 years old. Sears sets its age limit according to the individual state laws. Check with the manager at your local computer store to find out its policy about hiring young people.

If a computer store wanted to hire me to do odd jobs rather than to sell computers, should I turn them down?

Probably not. Starting small can be the best way to learn how a store operates and to find out about the computers it sells.

When 14-year-old Tom Pearl started working at the Program Store in Washington, D.C. three years ago, he washed windows and helped in the stockroom. After hours, the manager let him spend time trying out programs and working on different machines. Before long, he was offered a sales job. And today, at 17, Tom is senior sales person in the D.C. store.

Will I become a computer whiz kid if I work in a computer store?

You'll almost certainly learn a lot about computers. But you're also likely to learn something even more important.

"It's funny, but I think I learned more about people than I did about computers," says 16-year-old Josh Doenias, a salesman at the Computer Center in New York. "You have to take a different attitude with each person you deal with. Some are very easy to talk to, and others won't let you get a word in edgewise.... Eventually I began to understand the different personalities and everything fell into place." ◘

It started as a school project. But after more than a year of work, Eric Babinet, 16, was able to sell his game to a computer company.

DIARY OF A GAME DESIGNER

BY BILL CAMARDA AND ERIC BABINET

Eric Babinet's ninth-grade independent study computer project turned into *Star Crystals*, an arcade-style adventure game produced and sold by Program Design Inc.

In the two years since he bought an Atari 800, Eric, 16, has learned a great deal about programming, and how ideas can become reality in the computer business. Eric talked with ENTER's Bill Camarda about his experience creating and selling a game. Here, in diary form, is the story of how Eric went from beginner to pro.

MARCH 1982

Some of us were going to put together a robot for our class project, but it turns out that it's just too expensive. I have a new computer; maybe I can make up a computer game. It would be fun to try, and I have a few simple ideas that might work.

Doing it right won't be easy. I haven't done much with computers since I fooled around with them some in the fifth grade. And I can already see that if the game's going to be any good, I'll have to spend Easter vacation learning Assembly language, which is faster than BASIC but a lot more complex.

APRIL 1982

After many false starts at working with Assembly language, I've got the bare bones of my game in the computer. I like the game. Maybe I could even sell it. But to do that, I'll have to make it more sophisticated.

I looked at some arcade games and I've been trying to add some of their features—like faster action and bonus points. The game is getting a lot better.

I'm learning as I go. Some simple-looking things, like keeping score, aren't simple at all. Whenever the player shoots something, the program has to check how much to add, go through the complicated

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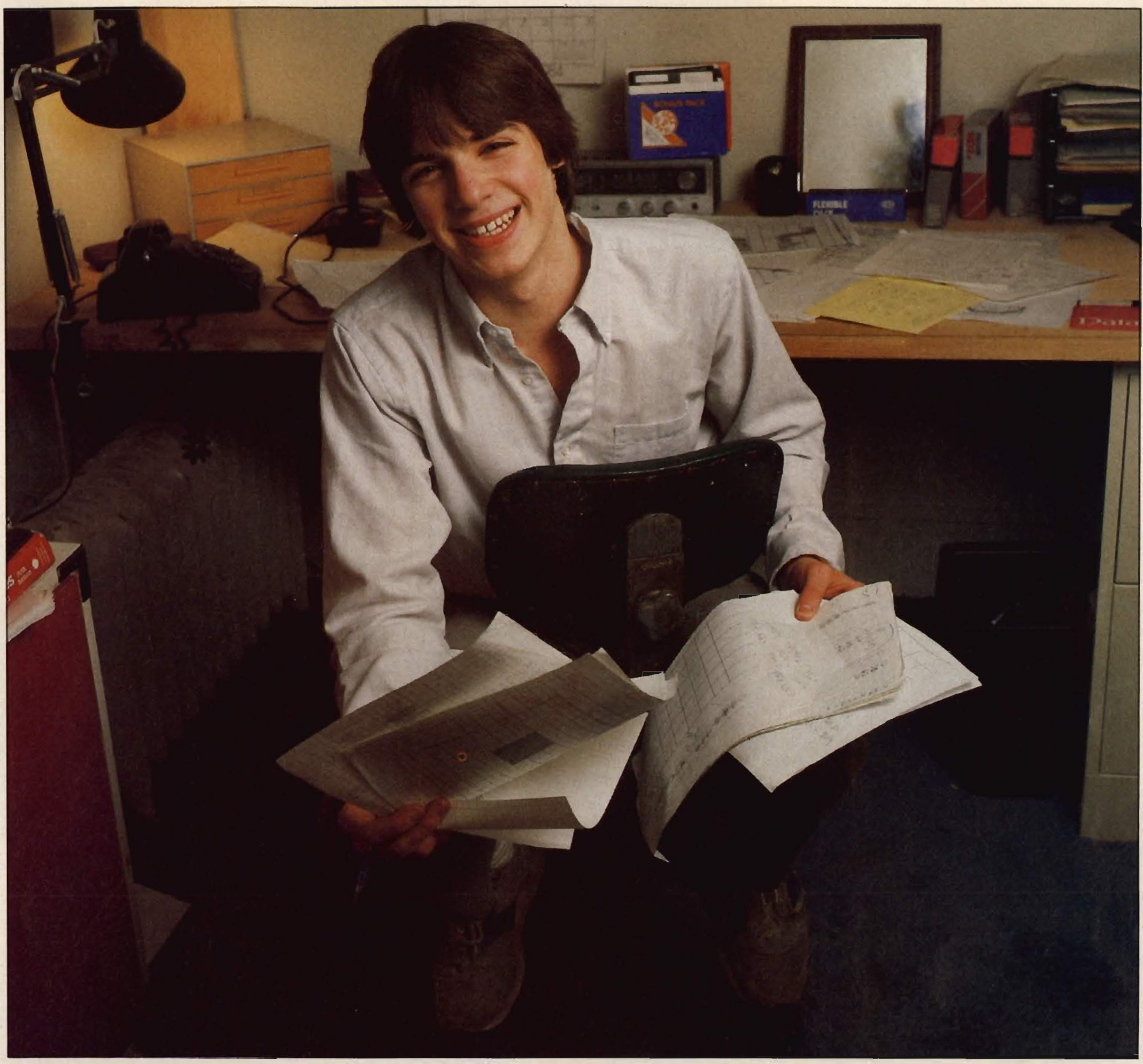

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computations, and then display it on the screen. That takes a lot of work on the computer. I've been picking up on routines like that from magazines.

MAY 1982

My game keeps changing. At first, I wanted two players to be able to play at once. Then I found out that it's easier to sell a game if people either can play alone or take turns. So I changed the game.

Unfortunately, no one I know has any experience with game designing, and I've been forced to do all the learning on my own. Some of my friends are interested in computers now, but none of them program. They are interested in my game but don't really understand what the programming involves.

Now my program has an annoying bug—sometimes the screen flickers. I can't figure out why.

The experience I've had—and, I'll bet, most programmers have had—is that you spend 60 percent of your time debugging a program. Programming is really just solving a series of problems. When some people come across a problem, they say, "Oh, a problem. Get someone else in here to solve it." But I like to solve it myself.

JUNE 1982

My brother's math teacher told me about a company here in Greenwich, Connecticut called Program Design, Inc. (P.D.I.) that sells educational software. He said I'd have nothing to lose if I showed them my game. I called, and much to my surprise I ended up talking directly with the company's president, John Victor. He said that they'd never specialized in games, but they'd been thinking about trying to sell some more. He also said he'd be glad to see me. So I went and showed him what I'd done so far.

It was very exciting. Mr. Victor and others liked my game, and could see its potential. However, we felt more work should be done before it is ready to market. We agreed that I

"Even if I don't make money, designing a game is great experience. ...But don't get me wrong—I'd like to make some money, too."

would work on it all summer and give P.D.I. a finished product in September. They'll give me a $500 advance and 15 percent of the money they get on the first 2000 games they sell. Then I'll get 20 percent on the rest—if it sells that many. Even if I don't make much money, this is a great experience. But don't get me wrong—I'd like to make some money, too.

Meanwhile, I found the flicker bug. Sixty times a second, the computer has to display a new picture. So it spends a lot of time working on that. You can use part of the time left over—it's called the "vertical blank"—to do other things. But if you ask the program to do too much, it won't finish in time to show the next picture. So it flickers.

I had to do a major reorganization of the program to stop this problem. It took two weeks, but it's done now and I feel pretty good about it.

One important thing I've learned about computer games: first you design the computer part of the game; then you create a story that blends with the graphics and game play. I finally wrote the story to go with my game: "The Earth is suffering from a severe energy crisis.... On the distant planet Croga, scientists found crystals with an amazing property: the crystals capture and greatly amplify solar energy.... The Crogans, unwilling to part with the crystals, have hidden them deep beneath Croga's surface. Intricate defense systems have been built.... Earth's international government, the Earth Federation, has assembled an elite corp of space troopers to travel to Croga and capture the crystals."

Obviously, the game won't be done by the end of school. This is taking much longer than I originally thought. So I gave a presentation in school on what I had completed. The game has become much more than a school project.

JULY 1982

Oh, no! P.D.I. has changed its mind and decided not to sell my game. P.D.I. prepared a letter of agreement, but my lawyer felt it didn't include everything it should. For instance, P.D.I. was supposed to provide a disk drive to help me finish.

So, my lawyer wrote up a new contract. We didn't change much, but someone at P.D.I. got the jitters. It's upsetting, but I can understand their point of view. Selling a game is a big commitment and involves taking a big risk. I'm not too worried, though. First I'll finish the game, then I'll find someone to sell it.

AUGUST 1982

I took August off to go on vacation with my family. I left the computer at home. All I did was decide on a name for the game , *Star Crystals*. And that only took a day.

When I'm at home, I don't just sit in front of a computer day and night like some people. I couldn't stand that. I'm very active in bicycling and sports. Taking a vacation was a good idea—I needed some time away from the computer.

SEPTEMBER 1982

Programming is like speaking a foreign language. You stop a while and come back a bit rusty, but pick it up again quickly. It felt odd coming back to my game after a month away. But I got comfortable again in a few days.

I wrote to some big software companies and one of them sent me an author's guide explaining exactly what they're looking for. They were pretty clear on how they wanted the documentation—the program instructions—done. They also sent me a nondisclosure agreement, which insures that they won't reject my game and then steal my ideas.

NOVEMBER 1982

Bad news. None of the big companies I tried were interested in *Star Crystals*. I'm very disappointed but not ready to quit. Maybe I'll try P.D.I. again. I've improved the game since they last saw it. Maybe they've gotten over their jitters.

DECEMBER 1982

After meeting with P.D.I. once again, they decided to accept it. We signed a contract, so it's definite. I'll

"This is great. My game is being manufactured now....And they're using my age to sell the game. For once, I'm glad I'm not older."

get what they were offering me in the first place. They decided the improved game was worth the investment. I'm putting some finishing touches on the game—adding music at the beginning and better graphics in some places. I'm also adding a "protection scheme," so people can't make free copies.

JANUARY 1983

This is great. P.D.I. has an artist drawing the cover and they're editing my game manual. Disks and cassettes are being manufactured now.

They're using my age as a way to publicize the game. For once, I'm glad I'm not older....

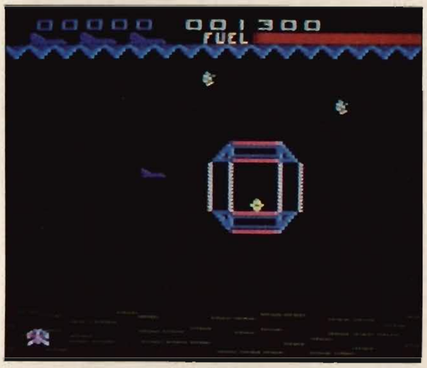
I just discovered a book has been published containing many programming tips and secrets for the Atari. It figures that they came out with it *after* I had discovered most of them.

JUNE 1983

The game is out and selling now....It's not doing as well as I'd like, but I still get a royalty check every month and that's satisfying. I'm not going to stop here, either. I'm working with a graphic designer in New York on a game. However, I'm going to be entering high school and won't have as much free time to work on programming. That's frustrating.

JULY 1983

I'm beginning to understand the problems of selling a game. I'd like P.D.I. to promote *Star Crystals* more, but when I asked the company president about that, he told me how much it can cost to do a lot of advertising. It made me appreciate more what P.D.I. *has* done. They're being fair. They have their own interests at heart, but they seem to care about mine.



Star Crystals' ***first screen.***

Looking back, I'd say *Star Crystals* is better than 60 or 70 percent of the games on the market. It's not the best in the world, but it's not bad for the first time.

What would I change? For one thing, I would let the player win, instead of just constantly repeating the hardest screen at the game's highest level. Then, the game would still be tough to beat, but players would get a reward. If a player gets that far, they really deserve to win. (Actually, *I've* never made it through all six boards myself.) I would also work on developing more complex and creative graphics. That would add to the game.

From now on, I'll have a better idea how I want a game to look *before* I do any programming. The design stage is extremely important. You can have a game that has a simple concept but is still challenging, rewarding—and popular. On the other hand, I've seen complicated games, where the programmer worked very hard, that are still boring.

Everybody in the computer industry can program, but it's coming up with the ideas and then expressing them through the program that's the hard part.

DECEMBER 1983

My game has run into some bad luck. P.D.I. is going to sell off the remaining copies of *Star Crystals*, but won't be ordering more.

I feel badly about it. But I'm also pleased about having gone through this whole process. What I've learned is much more rewarding than the money. The knowledge and experience will never be lost. I was very shy when all this started, but working with the people at P.D.I. and with the graphic designer in New York has helped me overcome this shyness.

What will I do now? Concentrate on school. The computer industry is so competitive that it is necessary to focus your full attention on it if you want to succeed. This is my junior year in high school and I'm looking forward to discovering new interests.

I like computers, and will probably work with them someday because they're everywhere. But I'm learning that there are a lot of other interesting things in life. I'm young. There's time to think about what to do next.

BILL CAMARDA, a freelance writer, wrote "Buying the Right Computer" in ENTER's premiere issue.

At 15, Kay Borzsony learned how hard the computer business can be. His pockets may be empty, but he's filled with second thoughts.

SOFTWARE SUCCESS

IT'S HARDER THAN IT LOOKS...JUST ASK KAY BORZSONY

BY STEVE SLON

It seems that every time you turn around, you hear another computer success story. Here's an 18-year-old who sold an idea to a major video game company and made a pile of money. There's a 15-year-old who wrote a computer book and went to college on the royalties.

But many of these tales of successful teenage video game designers leave out an important part of the story. They forget that there's a difficult side to the business world. Not all good game designs lead to success.

Kay Borzsony is 15. He's one of the "amazing success stories" you may have read about or seen on TV. He was featured in *Time* magazine and mentioned in computer books. But Kay's experience in the adult world of business was much more difficult than he'd expected. He had some good luck and some bad luck, but in the end Kay got burned. "It's really tough out there," he says now.

STARTING EARLY

Since he first used an Apple II at age 11, Kay had a knack for programming. In the summer of 1982, he formed a company, Aristotle Software, with his best friend, Jonathan Dubman. They were going to create and market programs. The owner of The Computer Room, a Chicago store where Kay had been doing odd jobs over the summer, offered to put some of the Aristotle software on the racks. It seemed like the first step in just another typical computer whiz kid success story.

Aristotle's biggest seller was a graphics editor, a sophisticated program that turns the cursor into a graphics controller. This software enabled users to manipulate triangles, boxes and circles. The shapes could be compressed, extended, rocked, bounced and scrolled; they could be filled with color or left hollow.

The price for the graphics editor was a very reasonable $30. Comparable programs typically sell for about $200. The Aristotle program sold well. One of the first buyers, rock star Todd Rundgren, used it to help design light shows for his band.

Then Kay and a friend wrote a program—a video game called *Castle Blaster*—that looked like an even bigger hit. A major game com-

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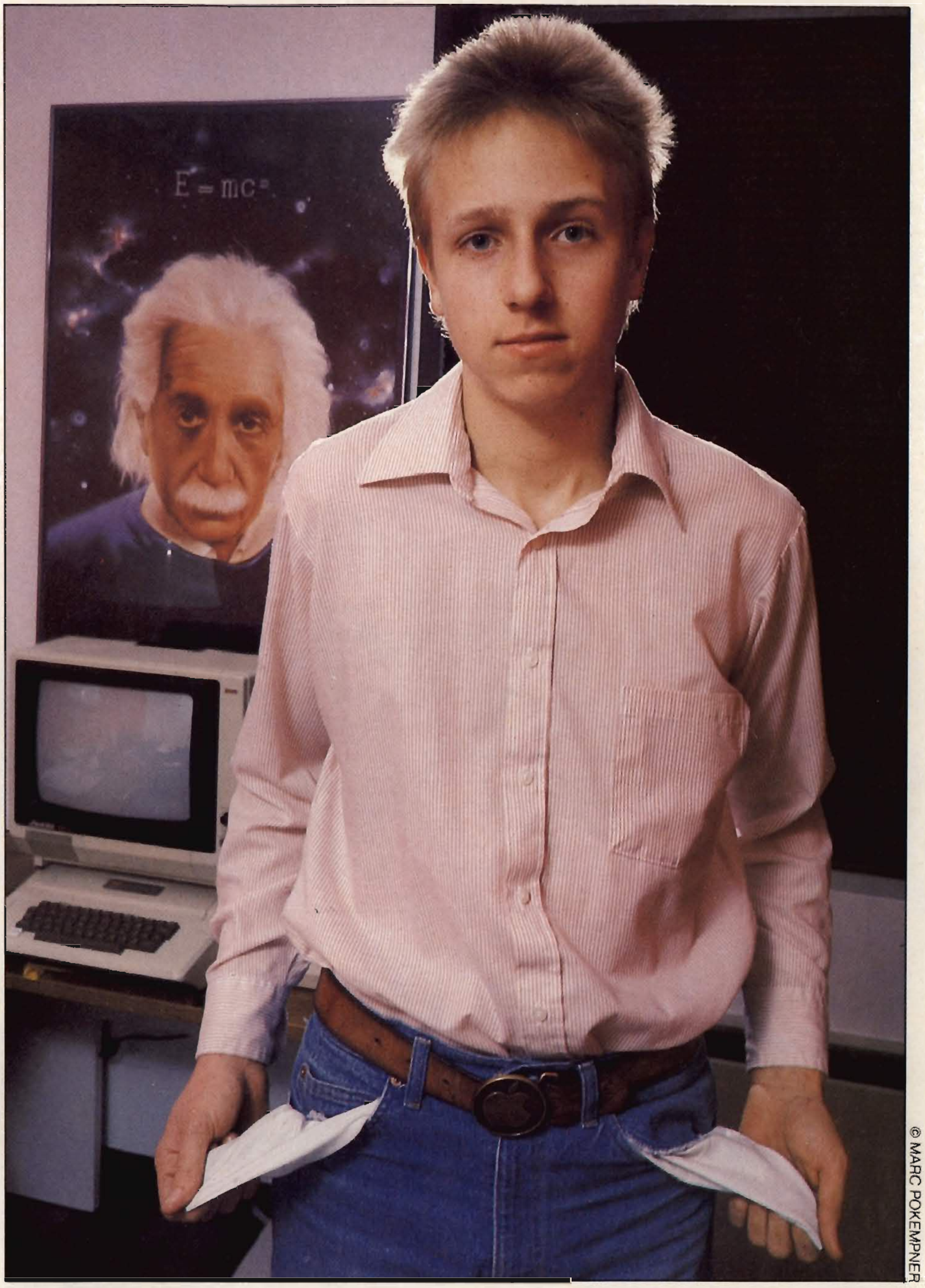

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pany heard about it and wanted to see it. They made no promises and mentioned no specific amount of money, but Kay believed they wanted to buy the concept.

Kay (who pronounces his name "Ki," rhyming with "Hi") had high hopes. He'd written a *Tron*-type game and a *Simon*-type game before, but this was a totally original program. As Kay describes it: "First you have to fight your way into an enemy castle, dodging cannon fire. Then you search for and save the princess. Last you find the gunpowder room, blow the place up and get out of there."

A 'WHIZ KID' IS BORN

While Kay waited to hear from the game company, *Time* Magazine discovered him. He had been corresponding with Apple Founders Steve Jobs and Steve Wozniak for some time. At an Apple Club meeting, a reporter from *Time* heard Jobs mention this young kid in Chicago who was making "millions of dollars" writing software. Steve was joking about the millions. (In fact, Kay had only made about $500 from the graphics editor.) But, soon after, Kay became a central figure in a *Time* cover story about kids and computers.

Then television's *PM Magazine* filmed Kay and Jonathan at the Computer Room. In the eyes of the

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Kay has lived the highs and lows. He hobnobbed with computer superstars, but also broke off with a close friend.

media, this computer wizard was already a smashing success. But in the real world, things weren't working quite so smoothly.

Kay and Jonathan began arguing. "I wanted to expand the business and get more systematic about it," says Kay. "Jonathan wanted to leave things alone."

Kay asked Jonathan to sign a contract with him; he wanted to buy stock with the money they'd earned, set up a company bank account, get a phone and open an office. Jonathan said "No." He was content with things as they were. The company had no bank account and all its records were stored in shoeboxes.

Unable to agree or compromise, the two founders of Aristotle Software parted ways. Since they shared the rights to the programs they had written together, they had to stop selling their software.

"Everything just blew to pieces," recalls Kay.

That wasn't all. The game company decided not to buy *Castle Blaster*. A few months later, another company put a very similar game on the market. Kay has no evidence, but he feels strongly that somebody cheated him, or, at the very least, accidentally leaked the game idea. He now warns other programmers to copyright their material before they send it to anyone.

BACK DOWN TO EARTH

It was the autumn of 1982. Suddenly, all the publicity and excitement were gone, and Kay was just another kid who had to go back to school and study again.

When he was in the spotlight, everyone seemed to forget that Kay was a kid, with a normal life and normal kid interests. He likes tennis and swimming and has a mania for collecting things. (His magazine collection includes every *Omni* that's ever been published.)

And, like a lot of other kids,he has his problems with school. By his own admission, Kay is a "C" student. To find the time for computers and his other interests, Kay's sometimes had to sacrifice good grades. "To get 'A's' I'd have to work four hours a night," he says.

Sometimes Kay doesn't have time to keep his room clean. "But, my mom makes me do it." Kay's mother does make a small concession to his computing talent by allowing him to leave his computer work area messy. Kay proudly describes this zone as "sloppy, full of papers, garbage, leftover food from yesterday—you name it. But," he adds quickly, "*I* know where everything is."

Under the chaos lie his computer components. The Apple II, with its printer, disk drives and modem, sits on a typewriter wing attached to his desk. Just to the left is a three-by-five-foot poster of Albert Einstein. "He's my idol," says Kay.

And, near Einstein, there's a signed photograph of the founders of Apple computer, Steve Jobs and Steve Wozniak. Kay likes to tell how he met Wozniak and Jobs. He simply sent them their first "thank you" letter for inventing the Apple. It wasn't a complaint, a demand, or even a request. Just a thank-you, from a person who appreciated what they'd done. They liked that.

The three built a friendship by mail and finally met in person at a meeting of the Chicago Apple Computer Club. There, with no warning, they called Kay up on stage in front of about 1,000 people and awarded him an Apple belt buckle with their signatures on it. The belt buckle is an extremely limited edition: there are only seven in the world.

MOVING ON

Kay has gone from the highs of hobnobbing with computer superstars to the lows of lost friendships. Along the way, he's learned a lot about the world of business.

"It's not really that complex," he says. "You have to research what you're getting into, and make sure you work well with your partner."

If the right opportunity comes along, Kay says he might return to this world of professional software design. But for now, he's satisfied being back where he began—going to school and writing computer programs just for fun. ⊟

STEVE SLON is a freelance writer in New York.

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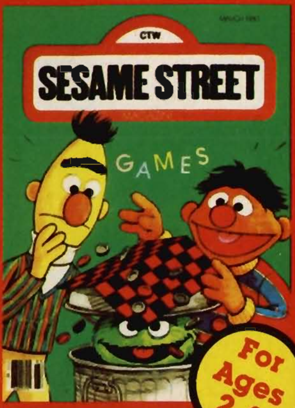

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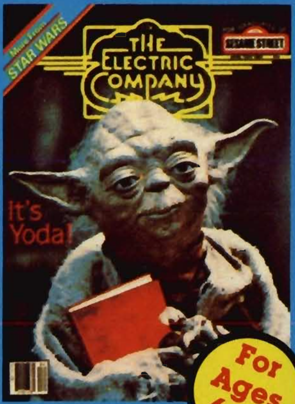

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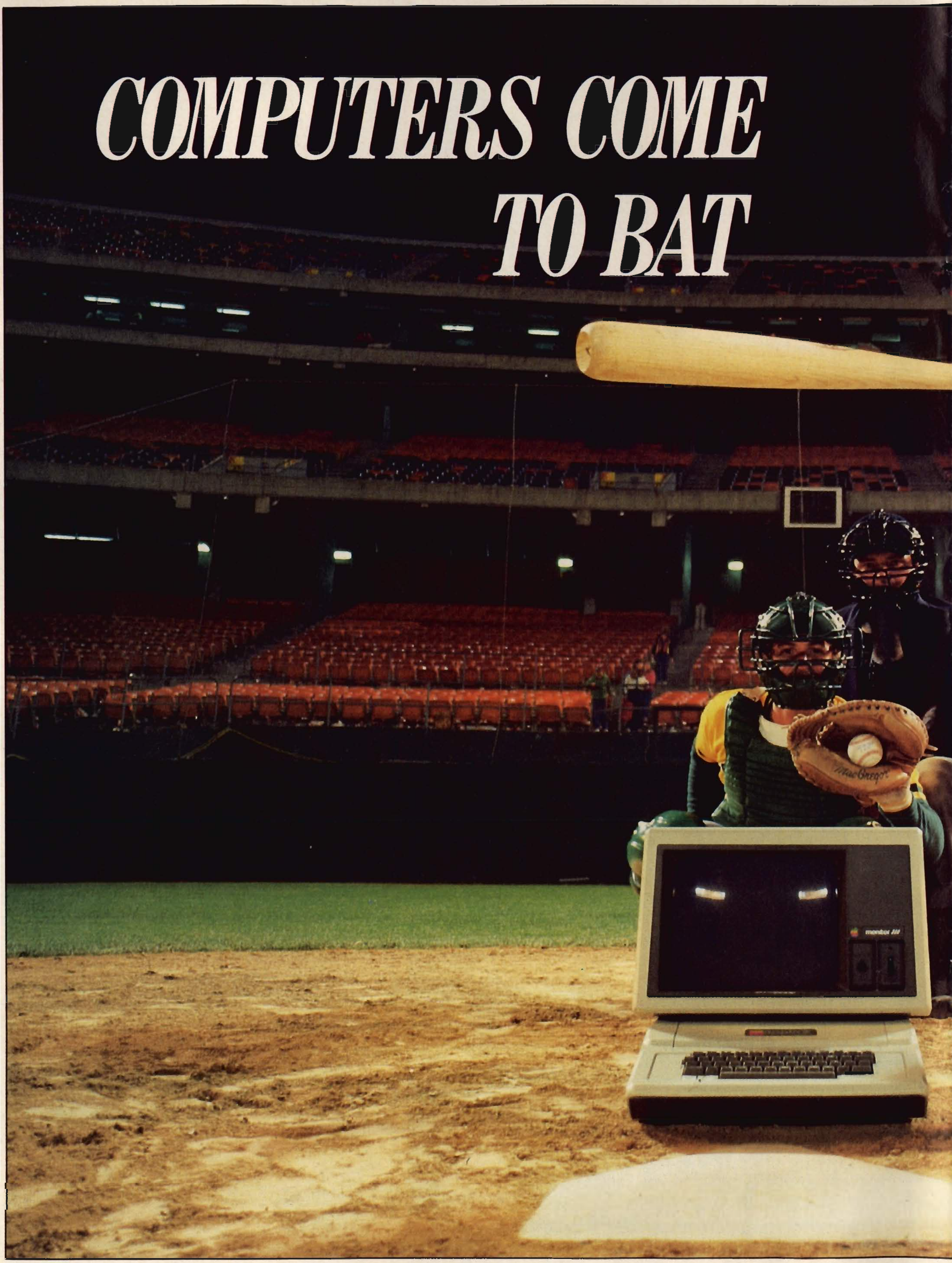
COMPUTERS COME TO BAT


MacGregor
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MAJOR LEAGUE TEAMS SWING INTO THE COMPUTER AGE.

BY JIM LEWIS

When last year's baseball season was over, bats had beaten bytes. The team without a computer, the Baltimore Orioles, topped the team with a computer, the Chicago White Sox, to win the American League Pennant.

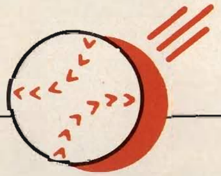
That was a sad day for White Sox fans and computer rooters, but it may have marked the real beginning of baseball's computer era. The White Sox, who hadn't been near a championship in 24 years, used a computer—and some top-quality players—to win more games than any other team. The computer alone didn't make the White Sox winners. But Chicago's success showed that computers can *help* a team.

"[Computer] information can't make decisions for you, but the better information you have, the better decisions you can make," White Sox manager Tony LaRussa said last season.

"The computer can help a manager make decisions that win a few games down the line," adds Steve Boros, manager of the computer-using Oakland A's.

Managers like Chicago's LaRussa and Oakland's Boros travel with an 'extra player'—a computer

Will printouts rule the dugout and robots argue with umpires?



operator. Perched in the press box behind home plate, the operator uses the computer to keep track of every pitch and hit.

"During the game, it's like using the computer to keep score," says the White Sox's Dan Evans, who operates the team's Apple II. "But after, you can do anything—anything imaginable—with the data." By analyzing that data, the computer shows a manager what has happened in previous games. That information can help a team win.

For example, Oakland is about to play the Milwaukee Brewers. Manager Boros asks A's computer operator Jay Alves to print out data about previous games. The computer will show where Robin Yount of the Brewers tends to hit the ball—and Boros can position fielders to be there to catch it. The computer will tell Boros which pitches Paul Molitor has trouble hitting, so he can tell A's pitchers what to throw. The computer lets Boros uncover the Brewers' weaknesses. In simple terms, Boros says, the computer can "make me a better manager."

ON THE FIELD

But no matter what the computer reveals, line drives will always beat disk drives. Steve Boros knows this, and you'll never see him—or Tony LaRussa—with printouts in the dugout.

"Absolutely not," says the Oakland skipper. "I don't have time to do that. I've got to watch the ballfield. I have to watch every one of my players...to take in all this information and react immediately."

Besides, stresses Boros, the computer is just *one* tool for helping him make decisions. Some players, he admits, resent the computer because they feel it's cold and impersonal.

"I think the players mistrust the computer because they really don't understand its use," the A's manager says. "When it comes down to what the computer says is good strategy and what's best for the player's state of mind, I'll always go with what's best for the player."

Early last season, for example, A's relief pitcher Steve McCatty faced Detroit Tiger slugger Chet Lemon with one out in the bottom of the ninth inning. There were two men on and the A's had a one-run lead. The computer showed that Lemon hit well against McCatty. But Boros stuck with his young reliever.

"I wanted to show McCatty that I've got confidence in him," recalls Boros. As it happened, Lemon lined the ball to second base. The A's got the double play and won the game. "I took a risk," Boros admits. "But if that player knows I've got confidence in him, that's going to help us in the long run."

And the computer can even help players build their own self-confidence, allowing them to overcome slumps.

"I think the computer will be most helpful as a teaching tool, to help correct mistakes and help somebody having a problem," says Chicago's Tony LaRussa. Boros agrees: "The beautiful thing is that the data can pinpoint specifics.... A printout is a dramatic way to

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Jay Alves of the A's tracks on-field action at his computer keyboard.

Line drives still beat disk drives. But computers can help.

show the player where there is a problem that has to be fixed."

If things still go wrong, players have been known to use the computer as an alibi. For instance, Boros gave Dwayne Murphy a hard time after the A's centerfielder was thrown out on his way to third base. Murphy didn't flinch; he just smiled and said, "Ah, skip, the computer made me do it."

While the A's and White Sox currently lead the league in use of computers, many other teams are getting help from the high-tech bullpen:

- Sixteen major league teams are on-line by modem to the Major League Scouting Bureau, getting up-to-date information on hot pro prospects.
- The Atlanta Braves and New York Mets will begin using computers during the 1984 season.
- The New York Yankees keep track of 4,500 potential prospects on their computer. They also provide announcers and sportswriters with computerized statistics.

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A's skipper Steve Boros checks printouts before —not during— the game.

BASEBALL CARDS

But ballparks aren't the only place bats and bytes get together. Baseball fans are also starting to use computers to keep track of teams and players. (For a program that lets you do the same, see "*Rate the Greats,*" next page.)

"I devise theories to explain how things in baseball are connected," says Bill James, who uses a KayPro II computer. "The computer helps me handle a lot more information."

James, whom many consider the ultimate fan, is author of the annual *Bill James Baseball Abstract*, a book of statistical observations about every team and player.

"I count all kinds of stuff that lots of people are sort of interested in, but nobody in their right mind would actually bother to count," says James. He looks at things like how players perform on their birthday. ("Very well," he says. "I guess they figure it's their day."), and even how teams play on grass as opposed to artificial turf. (While National League teams do best on artificial turf, American League teams tend to have the edge on real grass.)

This year's edition of the *Bill James Baseball Abstract* is the first that was put together with the help of a computer. But Bill has been keeping track of statistics since he was a young boy collecting baseball cards. Switching to a computer has had advantages, he admits: "Data in your computer is a lot easier to experiment with and retrieve," Bill says. He quickly adds, however, that "a computer has no idea of what you should do with those numbers ....You still have to think."

Bill James thinks major league managers who use computers should be careful. A computer can help, but following its advice is not always the best strategy. "In baseball, there is an advantage in doing something unpredictable. There is always going to be a guessing game involved," he says. "If that guessing can be improved by computers, that can be good."

But some fans fear the sport's magic will be lost if baseball becomes too computerized—managers won't make a move without consulting their database, and robots will argue with umpires.

"That sounds fun," laughs Bill. He disagrees, however, with those gloomy predictions. Even the most powerful computer can't know everything that could affect the outcome of a ballgame, Bill stresses. "I could not imagine a computer big enough to store all that information, or complex enough to deal with it all."

Baseball's computer-users know their machines will never keep track of every pebble on the infield. But computers can still help them field a lot of helpful information.

And when you're trying to win a ballgame, says Steve Boros, "You take whatever help you can get."

JIM LEWIS is senior editor of ENTER.

RATE THE GREATS

BY GREG TRAUTMAN

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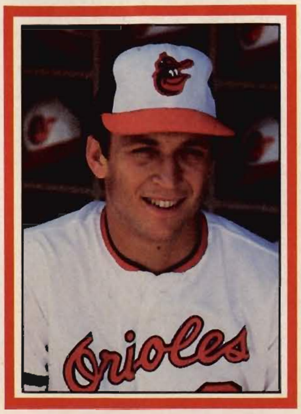
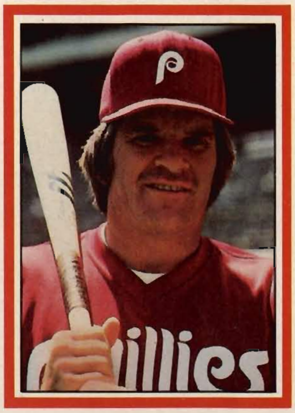


CAL RIPKEN
ORIOLES *.788*



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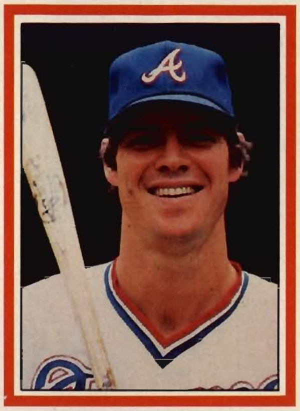
REGGIE JACKSON
ANGELS *.581*



DALE MURPHY
BRAVES *1.008*

Take me out to the ballgame, get me some peanuts and Cracker Jacks—and a few statistics—and I'll tell you who's the best player out there on the field.

How? Well, it's not the peanuts and Cracker Jacks. (I only wanted them because I was hungry.) I've devised a computer program that rates ballplayers using some easily obtainable performance statistics. As quick as a Nolan Ryan fastball, you can enter the program into your computer and produce a number that reflects a player's overall value. It may seem simple, but it's a great way to win a baseball argument.

BATTER UP!

To write this program, I combined the five leading indicators of a player's offensive power—batting average (BA), home runs (HR), runs batted in (RBIs), hits (HT) and stolen bases (SB). I then entered these numbers (which you can find in any Sunday newspaper) into the computer, using these input statements:

```
10 INPUT "BATTING
AVERAGE"; BA
20 INPUT
"HOME RUNS"; HR
30 INPUT "RBI's"; RBI
40 INPUT "HITS"; HT
50 INPUT "STOLEN
BASES"; SB
```

That was the easy part: lines 10 to 50 assign the variables. The hard part was coming up with a formula to fit these variables together. I had to make sure a home run was worth more than a stolen base and an RBI more than a hit.

Every time I thought I had a perfect formula, strange things would happen. For example, one formula showed that John Wockenfuss—a solid but unspectacular major leaguer—was twice as good a player as California superstar Reggie Jackson. I knew there was a problem.

Then, like a line drive off the bat of Rod Carew, it hit me: "The Adjusted Batting Average Formula." The formula gives each of the variables a different *weight,* so that a home run is worth six hits, a run batted in worth two hits, and a stolen base worth one. Line 60 figures the number of at bats (AB), and line 70 divides the other variables by this number.

To put this formula into your computer, just add the following:

```
60 AB=HT/BA
70 TOTAL = (HT+(4*HR)+
(2*RBI)+SB)/AB
80 PRINT TOTAL
```

Using statistics from the 1983 baseball season, for example, my Adjusted Batting Average Formula gave American League Most Valuable Player (MVP) Cal Ripken a .788 average and National League MVP Dale Murphy an astounding 1.008. The formula also confirms that 1983 was an off year for stars like Reggie Jackson and Pete Rose. Jackson's score was .581, and Rose's .442.

There's a flaw in the formula. There's no allowance for defensive play. A player who makes stupendous catches won't get full credit.

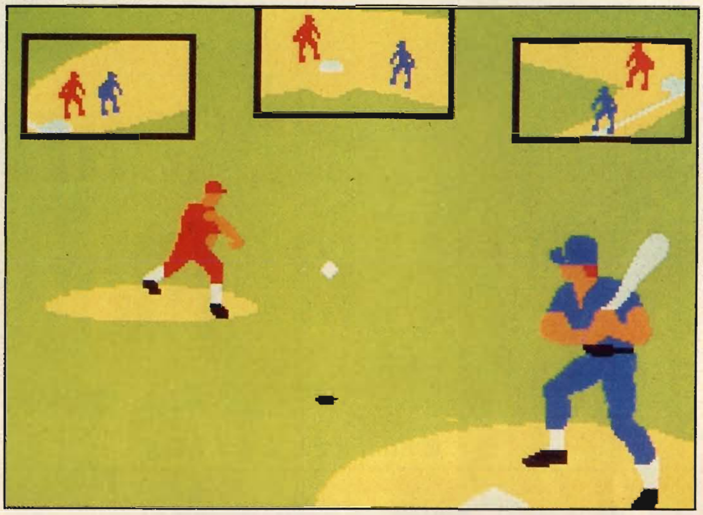
It's possible to write a program that includes defensive information. You might want to try.

Meanwhile, could you pass the Cracker Jacks, please?

GREG TRAUTMAN, 17, is a member of the ENTER advisory board.

VIDEO BALLPARK

BY PHIL WISWELL



You don't have to be Steve Boros of the Oakland A's to get managing help from a microchip. *Super Action Baseball*, a new home video ball game from Coleco, can turn you into a state-of-the-art skipper.

In the past, video game baseball teams were tough to control. You could move runners and pitchers around, but other players were very difficult to keep in the action. With *Super Action Baseball*, it's a whole new ball game.

HANDS-ON BASEBALL

Super Action Baseball (for ColecoVision) comes with Super Action Controllers that combine a joystick, speed roller, 12-key keypad and four trigger buttons. Together, these controls give you the power to move any player on the field.

As the game begins, you get a view of the pitcher and batter while three 'windows' show what's happening on the bases. The instant a ball is hit, you get a full field view.

The pitcher selects a pitch on the keypad and fires away. But this game lets you do more than just press a button to pitch. By wiggling the joystick, you can get real control over the way the baseball crosses the plate. A good pitcher can mow down the opposition with the style and flair of a Steve Carlton. A no-hitter is a real possibility.

The batter also has control—and, as in any ballgame, timing is everything. Time your swing, flick the joystick and you can bop that ball right over the wall. But you had better have quick reflexes if you've got to run the bases. The game's speed roller—which moves the runner around the bases—is just not as responsive as it should be. You really have to spin to get anywhere.

To control your fielders, squeeze the appropriate trigger button and move the joystick. It's a real challenge to remember which trigger activates which player. But once you've got that down, you'll be able to move any player almost anywhere on the field. As soon as your fielder has the ball, just aim and throw. If it's a close play, the umpire will let you know who won. As in real baseball, it doesn't do any good to argue with the ump.

TALKIN' BASEBALL (ALMOST)

About a year ago, there was a breakthrough that could have given you even more control over your video game ball team. This breakthrough, the MBX (Milton Bradley Expander) included a microphone headset that let you use your *voice* to control on-the-field action. Unfortunately, the MBX only worked with Texas Instrument home computers. When T. I. went out of the home computer business, Milton Bradley stopped making the MBX.

The MBX added a new dimension to game control and I was sorry to see it disappear. Perhaps somebody will make this kind of voice controller for other computers. Then, when you call out "Play ball!" you can really play ball.

PHIL WISWELL is an ENTER contributing editor.

THE MYSTERIOUS CASE OF THE

Meandering Flowchart

BY MICHAEL DAYTON

A crazed computer programmer has stolen all the software for your town's traffic computer, and won't give it back unless he is paid off with a guest appearance on *Whiz Kids*. Meanwhile, all the traffic lights in town are stuck on red. Main Street looks like a giant parking lot.

It's up to you to recover the stolen programs, but the only clue you have is a ragged piece of printout paper found at the scene of the crime. On it is a jumbled scrawl of shapes and lines—the mad programmer's *flowchart* of the steps you must take to track down the hidden software.

This rambling flowchart is found on the following pages. To get to the software, you'll have to cross a river and avoid a series of traps along the way. Watch out for the dreaded endless loop—a common programmer's pitfall. And remember to pick up all the equipment you'll need, including a four-part access code.

Before you start, you'll find some helpful information about flowcharts on these two pages. Remember, though, the flowchart map to the hidden software was written by someone dealing without a full deck of microchips. So, be prepared for surprises.

What sequence of *Y* and *N* moves will get you through quickest? Try your luck, then check the answer on page 64.

GO WITH THE FLOW

A flowchart is simply a diagram of the steps you want your computer to take when you run your program. It helps you organize your thoughts before you sit down to write. It's also a useful tool for debugging your work—even *after* the program is running.

Writing a flowchart helps you arrange the steps your program will follow before you write a single line of programming code. It's especially useful because it can give you an overview of the entire structure of your program. That's not important if the program you're writing is only ten lines long. But even professional programmers can get lost in their own logic once a program runs longer than a hundred lines.

Flowcharts will not only make your programming easier, they will make you a better programmer. If you find yourself drawing a flowchart that looks like a bowl of spaghetti, that's a sign that your program is too complicated. Keep at it until you have the simplest flowchart possible. (Our flowchart is a lot of fun, but it would make a terrible program.)

DON'T THROW IT OUT!

When you're done writing the program, don't throw your flowchart away. You'll find it's very helpful in debugging—getting your program to run the way you wanted it to. When you start seeing error messages, sometimes the only thing to do is to step through the program, one line at a time. Your flowchart makes it a lot easier to do this and to pinpoint where your mistakes are.

Did you ever read a program written by someone else and try to figure out what it's supposed to do? Flowcharts come in handy then, too. They give you a simple explanation of what the program is about.

Flowcharts exist only to help you, so you can make them up anyway you want. But remember—you may need to refer to your chart weeks after it was written. Or someone else may want to look at it in order to understand what you had in mind. That's why it's a good idea to follow some simple conventions.

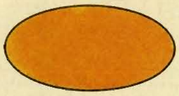
First, there are commonly used symbols for the different steps a program can take (see glossary). Second, flowcharts generally should move from top to bottom and from left to right.

Below, we've given you a very simple flowchart for a program that writes the word "Hello" five times. That should give you an idea of how the different symbols are used and put together. Will that help you get started in flowcharting? We hope so. Will it help you recover the stolen programs on the next page? We doubt it—but good luck!

FLOWCHART FIELD GUIDE

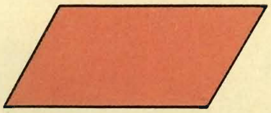
Here is a simple flowchart for a BASIC program that prints the word "Hello" five times. Notice that in the chart we have abbreviated the BASIC statements in some cases. This is a common practice, but if you want, you can write out the whole statement. Also, it's a common practice to include a START and STOP symbol, even if your program does not contain matching statements.

GLOSSARY

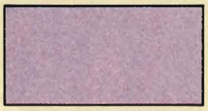


Start or Stop

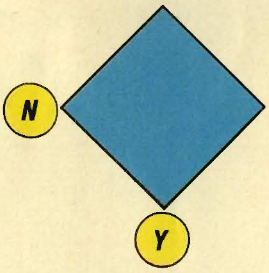
Indicates path
program will follow



Input or Output

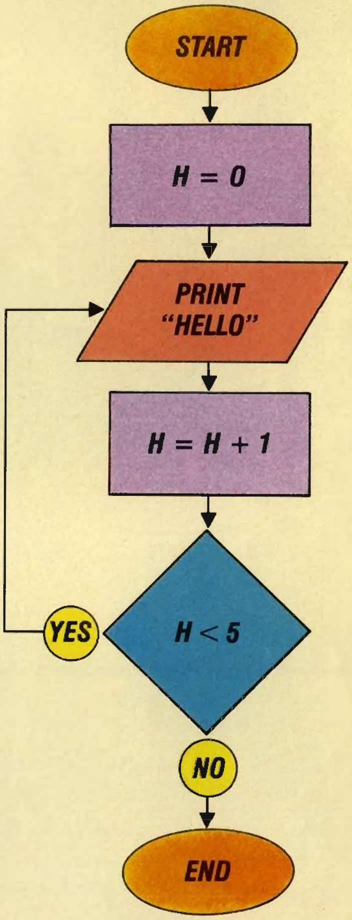


A single step



A decision box—either a question or a comparison—with two exit points.
A connector symbol—joins one part of the flowchart to another. "Y" means yes and "N" means no.

SAMPLE FLOWCHART



PROGRAM

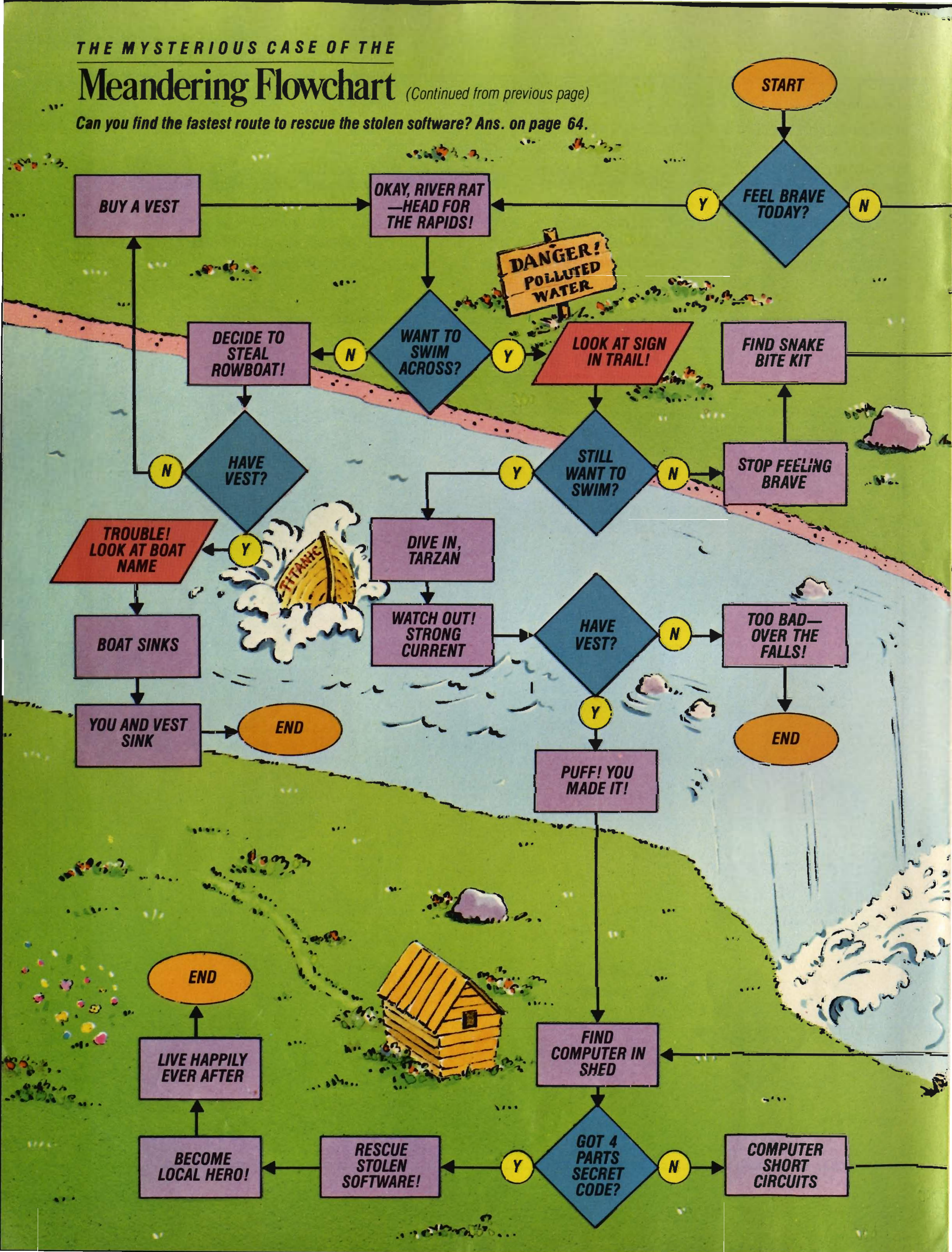
```
10 H = 0
20 PRINT "HELLO"
30 H = H + 1
40 IF H < 5 THEN 20
50 END
```

THE MYSTERIOUS CASE OF THE

Meandering Flowchart

(Continued from previous page)

Can you find the fastest route to rescue the stolen software? Ans. on page 64.


START
FEEL BRAVE TODAY?
Y
N
OKAY, RIVER RAT —HEAD FOR THE RAPIDS!
BUY A VEST
DANGER! POLLUTED WATER
WANT TO SWIM ACROSS?
N
Y
DECIDE TO STEAL ROWBOAT!
LOOK AT SIGN IN TRAIL!
FIND SNAKE BITE KIT
HAVE VEST?
N
STILL WANT TO SWIM?
Y
N
STOP FEELING BRAVE
Y
TROUBLE! LOOK AT BOAT NAME
TITANIC
DIVE IN, TARZAN
WATCH OUT! STRONG CURRENT
HAVE VEST?
N
TOO BAD— OVER THE FALLS!
BOAT SINKS
YOU AND VEST SINK
END
Y
END
PUFF! YOU MADE IT!
END
LIVE HAPPILY EVER AFTER
FIND COMPUTER IN SHED
BECOME LOCAL HERO!
RESCUE STOLEN SOFTWARE!
Y
GOT 4 PARTS SECRET CODE?
N
COMPUTER SHORT CIRCUITS

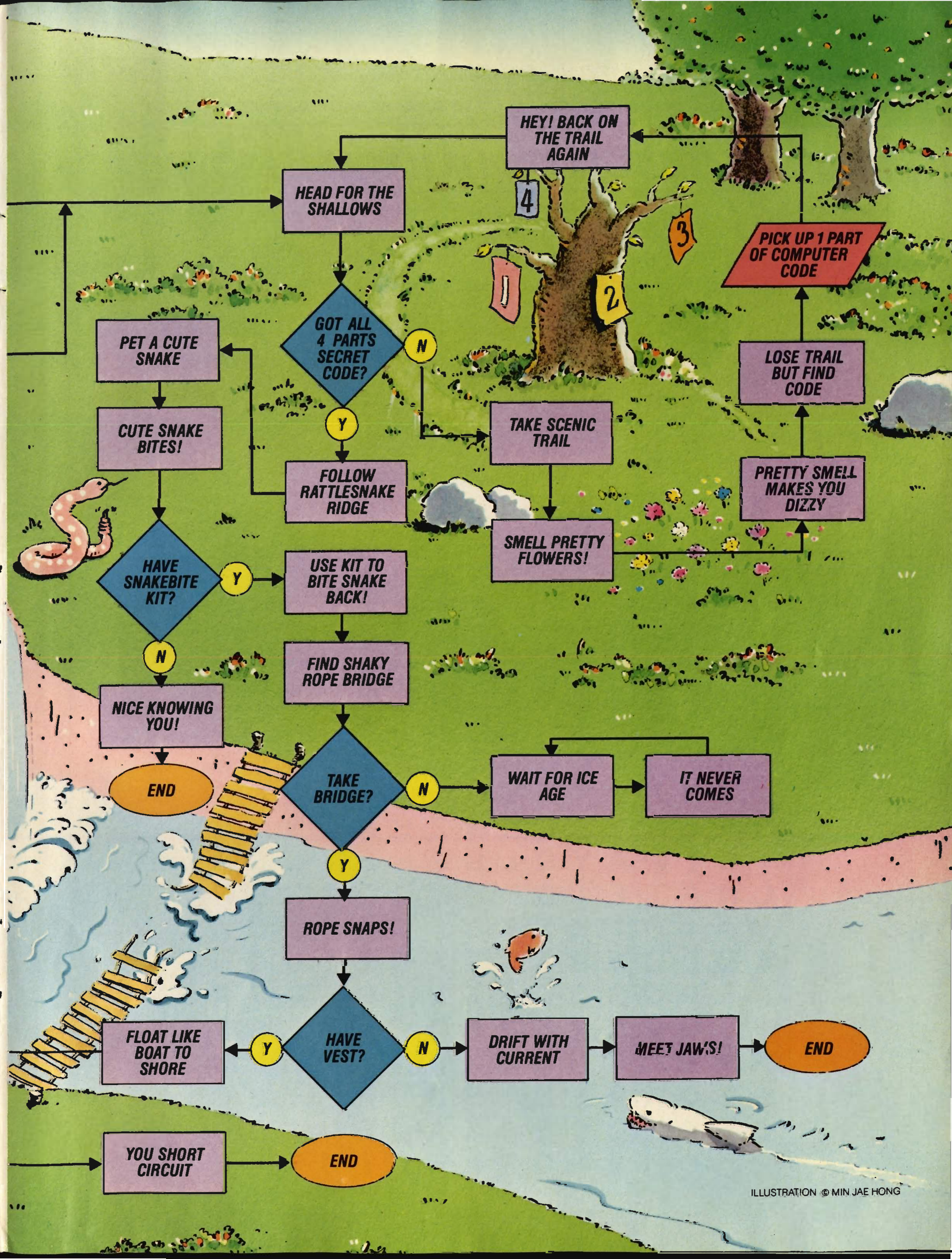

HEY! BACK ON THE TRAIL AGAIN
HEAD FOR THE SHALLOWS
4
3
1
2
PICK UP 1 PART OF COMPUTER CODE
GOT ALL 4 PARTS SECRET CODE?
N
Y
PET A CUTE SNAKE
CUTE SNAKE BITES!
FOLLOW RATTLESNAKE RIDGE
TAKE SCENIC TRAIL
LOSE TRAIL BUT FIND CODE
PRETTY SMELL MAKES YOU DIZZY
SMELL PRETTY FLOWERS!
HAVE SNAKEBITE KIT?
Y
USE KIT TO BITE SNAKE BACK!
N
FIND SHAKY ROPE BRIDGE
NICE KNOWING YOU!
END
TAKE BRIDGE?
N
WAIT FOR ICE AGE
IT NEVER COMES
Y
ROPE SNAPS!
HAVE VEST?
Y
FLOAT LIKE BOAT TO SHORE
N
DRIFT WITH CURRENT
MEET JAWS!
END
YOU SHORT CIRCUIT
END

ILLUSTRATION © MIN JAE HONG

PENCIL CRUNCHERS

GAME SEARCH

BY REBECCA HERMAN

To play the games listed below, you need a computer. But to find them in our word-search all you need is a pencil! The words are hidden across, up and down and diagonally. Some letters may be used more than once.

When you've found all 25 games, start at the top left and write down all the uncircled letters—they'll spell out a computer riddle and its punchline.

ARCHON
CHOPLIFTER
CRITICAL MASS
CROSS FIRE
DEADLINE
GRUDS IN SPACE
LEGIONNAIRE
LODE RUNNER
MASTER TYPE
NEW WORLD
OIL BARONS
PARSEC
PENSATE
PIE MAN
RICOCHET
ROBOTWAR
ROCKY'S BOOTS
SERPENT'S STAR
SHAMUS
SOCCER
TIME ZONE
TRANSYLVANIA
WAYOUT
WIZARDRY
ZORK I

(Answers on page 64)

E	C	R	I	T	I	C	A	L	M	A	S	S	N	W	H
T	R	E	P	Y	T	R	E	T	S	A	M	E	A	R	T
R	D	I	S	H	A	M	U	S	E	I	W	R	R	O	D
A	T	H	F	E	C	O	O	P	N	W	I	P	E	C	N
N	M	R	R	S	Y	P	U	A	O	T	Z	E	N	K	O
S	T	E	A	A	S	E	R	R	Z	E	A	N	N	Y	H
Y	S	T	W	A	Y	O	L	S	E	H	R	T	U	S	C
L	N	F	T	E	I	D	R	E	M	C	D	S	R	B	R
V	A	I	O	T	K	E	T	C	I	O	R	S	E	O	A
A	M	L	B	A	R	A	O	T	T	C	Y	T	D	O	H
N	E	P	O	S	O	D	E	F	L	I	O	A	O	T	P
I	I	O	R	N	Z	L	P	Y	D	R	I	R	L	S	S
A	P	H	L	E	G	I	O	N	N	A	I	R	E	K	L
E	E	C	A	P	S	N	I	S	D	U	R	G	T	S	G
O	F	S	O	C	C	E	R	X	A	M	E	U	L	B	O
R	A	D	R	S	N	O	R	A	B	L	I	O	I	V	E

Games Gone GONZO

ONE MAN'S VIDEO VISIONS

Over the past few months, I've done an extremely unscientific study of the video games people play. As a result, I've come to a few important conclusions. In the interest of science, truth, justice and a few laughs, I am pleased to offer my observations to ENTER's readers.

First of all, it seems to me that video and computer games are about where electric guitars were in the early 1960s. They've been around for a while, but your parents would feel a whole lot better if you were playing the trombone instead. Mine would have, anyway.

See, in the early 1960s you couldn't say, "Hey, Mom, gimme a thousand dollars so I can play power chords while my friend Hal howls nonsense at screaming girls." Instead you had to say, "They really need a guitar in the school marching band. They're going to give me a 400-foot extension chord and a wagon for my amp, so all we have to do is buy a Stratocaster and a Twin-Reverb."

Which is just like now. You can't say, "Hey, Mom, gimme a thousand dollars so I can chase Thorax the Barbarian through the Maze of Death." Instead you gotta say, "My teacher says if you buy me a Commander Goonwaddle XJ7P, it'll teach me how to balance a checkbook."

OBSERVATION NUMBER TWO

My second discovery was that I don't play video games very well. Last summer, I was doing a story about the rock band REO Speedwagon. They had a *Zaxxon* set up in their dressing room. So I played *Zaxxon* for about 12 hours when I should have been interviewing musicians. Fortunately they had it fixed so you didn't have to put in money, or I would have spent my entire story fee before I zapped *Zaxxon*. I have been very wary of learning any new computer games since then. Put in a quarter and by the time you look up, your rent money is gone.

Now we get to the meat of this essay. I figure the only way to beat the video game system is to invent your own games and let someone else give you his quarters. So I'm hoping someone out there who knows how computers work will write a program for the following six incredible games that I've invented, and cut me in for half the royalties. My ideas are on the next page. If you cooperate, we can get rich together.

BY CHARLES M. YOUNG

GAMES GONE GONZO

GRAND PRIZE!!

SPACE PROCRASTINATORS

On the third moon of Jupiter, Dad wants you to mow the lunar lawn before the Martians come over for dinner. This voice-controlled game lets you use your wits to avoid work. Points are awarded for creative excuses that let you remain in bed watching interplanetary TV and munching Jupiter junkfood. Penalties are assessed for sulking so much that Dad yells at you and makes you wash and wax the family space shuttle. Grand prize: Dad mows the lawn himself.

In a later screen, you must avoid handing in a homework assignment on the major exports of the planet Pluto. If your excuse works, the teacher lets you take a field trip to Oreo, a cookie-shaped moon in the Nabisco galaxy. If you lose, you mow the teacher's lawn.

PUNKEY KONG

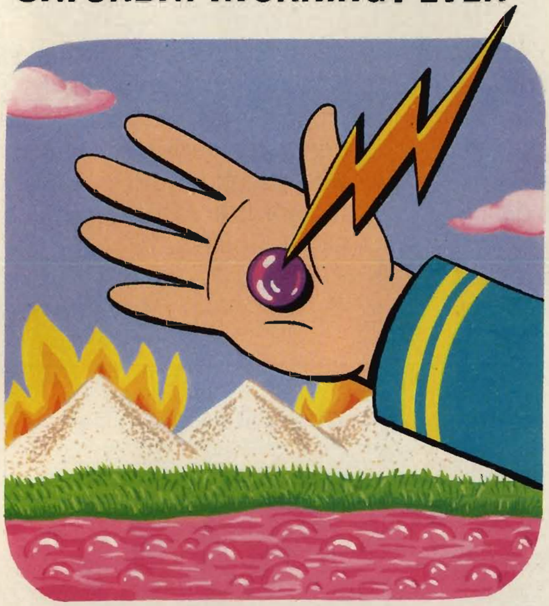
On the top of the Empire State Building, a giant ape with a short haircut is playing dissonant guitar chords and screaming about the sickening state of modern society. Down below, thousands of pedestrians are stuffing cotton in their ears in an attempt to escape the noise. Can you climb a skyscraper fast enough to save New York's hearing? Or will you have to use a Jefferson Airplane to get the ape?

TOOTSIE-TRON

You accidentally press the wrong button on a computer and are sucked into a strange electronic world where you must star in a soap opera. To win, you must avoid autograph-seeking fans, potential boyfriends—and girlfriends—and arrive at your TV show on time. Grand prize: you become the romantic lead in the soap.

ILLUSTRATIONS © SUSAN FAIOLA

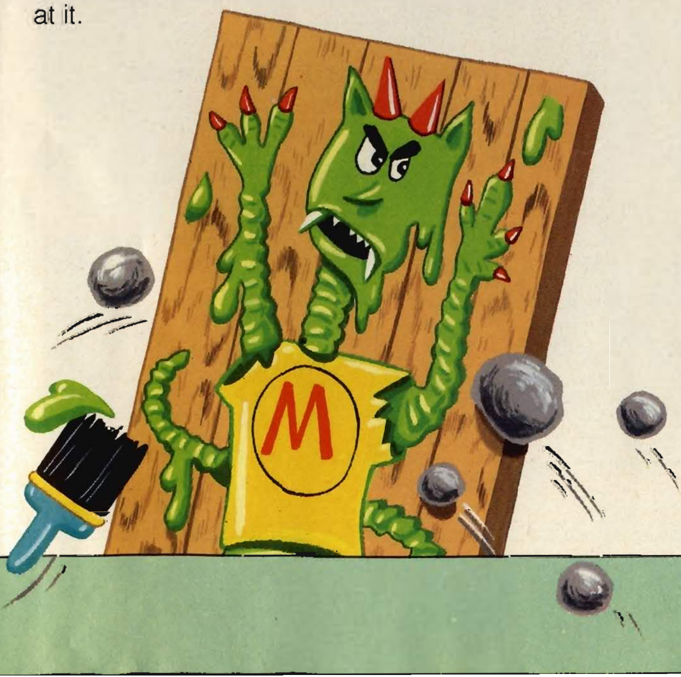
SATURDAY MORNING FEVER



Fighting off extremely dumb cartoon characters, you must swim the boiling Sea of Food Coloring, cross the burning Dunes of White Sugar, and capture the Vitamin Pill guarded by Captain Cereal.

ATTACK OF THE NO-FRILLS-OID

Paint a monster on a piece of plywood and throw rocks at it.

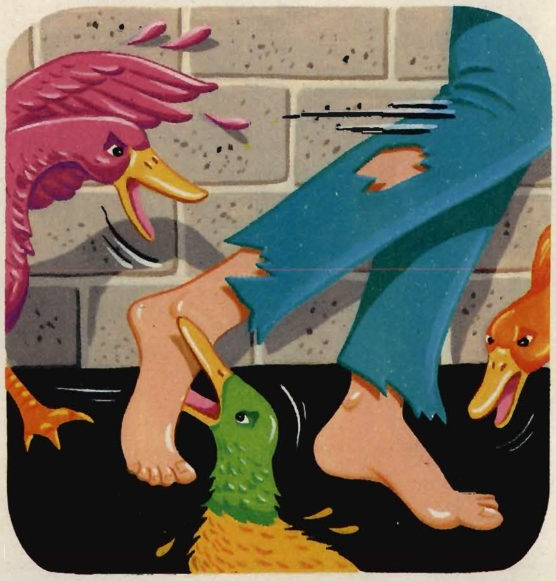


DR. DECIMATION AND THE DEMON MALLARDS OF MINNOW MOUNTAIN

The Ultimate Science Fiction Video Game

You have been captured by a mad scientist whose castle is guarded by a flock of killer ducks. He takes away your sneakers and glues small fish and insects to your feet. You must twist your way through the maze-like chambers of the castle, evading the hungry ducks who are snapping at your toes.

If you reach the castle's exit sign (conveniently lit up in the dungeon), the scene then changes to a rope-and-chain screen. There, a rescue party—the Thing, Luke Skywalker, and the Eggplant That Ate Chicago—takes you to safety in the *Starship Enterprise.*



CHARLES M. YOUNG, who really can't play video games very well, has written for The New York Times *and* Rolling Stone.

ENTER CONTEST

Did you see *your* favorite idea for a video game here? If not, send us a description of the silliest or dumbest game you can think of. If we like your idea, we'll print it in ENTER, and send you a T-shirt. Send to: ENTER, 'Silly Games,' P.O. Box 777, Ridgefield, N.J. 07657.

PENCIL CRUNCHERS

COMPUTER SCRAMBLE

BY PHIL WISWELL

Here's a chance to test your computer savvy and unscramble words at the same time. Below are 14 computer terms that have been scrambled into other words. Can you rearrange the letters so that they become computer words and match up with their definitions on the right?

For more of a challenge, test your unscrambling skills by covering up the definitions and working from the scrambles alone. Or, test your knowledge of computer terms by covering the word list and trying to figure out the words from the definitions alone. Good luck!

(Answers on page 64)

1. **VASE**	___ ___ ___ ___	Make a copy of a working file
2. **URN**	___ ___ ___	Command to start program
3. **TURNER**	___ ___ ___ ___ ___ ___	What one does at the end of a line
4. **SKID**	___ ___ ___ ___	Where to store lots of data
5. **BROAD**	___ ___ ___ ___ ___	Attach chips here
6. **SUB**	___ ___ ___	Allows flow of data from one computer component to another
7. **SILT**	___ ___ ___ ___	How to summon your program lines from memory
8. **MOPER**	___ ___ ___ ___ ___	One kind of silicon chip for game software
9. **WOLF**	___ ___ ___ ___	Movement of electrical current through computer
10. **PEON**	___ ___ ___ ___	Gets you into a closed file
11. **STEER**	___ ___ ___ ___ ___	What to do at the end of a game
12. **CORSET**	___ ___ ___ ___ ___ ___	Part of a track on a disk
13. **DARE**	___ ___ ___ ___	BASIC command to look for a Data statement
14. **PROTEIN**	___ ___ ___ ___ ___ ___ ___	Keeps track of a specific memory address

BASIC TRAINING

PROGRAMS FOR YOUR COMPUTER

Adam, Apple, Atari, Commodore 64, IBM, T.I. 99/4A, Timex-Sinclair, TRS-80, VIC-20

Faster than an owner's manual! More exciting than TV! Able to program sound and graphics with a single keystroke! Look! There in the magazine! Is it an article? Is it a puzzle page? No, it's BASIC TRAINING!

Yes, BASIC Training, which disguised as a mild-mannered section of ENTER magazine, every month brings you truth, justice, programming and the American way.

We'd like to thank all of you for the great programs and ideas you've been sending in. And thanks for the enthusiastic response to the BASIC Training Challenges. We'll start printing your responses in the next issue. (For more on the Challenge and sending in your programs, see the last page of BASIC Training.)

Just keep those cards and letters coming, folks—but please, no Kryptonite.

—Richard Chevat, Technical Editor

ATARI: BUBBLE SORT

ILLUSTRATIONS © MARY LYNN BLASUTTA

No, a bubble sort is not something you do in a bathtub full of soapsuds. It's the name of one of the simplest methods of sorting data with a computer.

Many people think there is some magic "SORT" button on computers that allows you to alphabetize items or put lists in numeric order. But like everything else a computer does, sorting has to be programmed.

The bubble sort got its name because if you display a list while it is being sorted this way, items appear to float or "bubble up" to the top until they find their correct place. And that's exactly what this program does—it displays a bubble sort in action on your screen.

You choose the characters to be sorted—either letters or numbers—and the program will show you how the sorting process works. Do you know *how* the computer determines which characters go first? It gets the ASCII value of each character in lines 160 and 170 and compares them in line 180. (If you don't know what ASCII is, take a look in your owner's manual.)

If the program moves too quickly for you to follow, you can change the delay loop in line 185 to: 185 FOR D = 1 to 300: NEXT D.

```
10    GRAPHICS 0
20    DIM X$ (1):REM FOR
      EXCHANGE
30    DIM A$(1023)
40    REM 1023 = SCREEN
      SIZE - 1
50    PRINT "THIS PROGRAM
      DEMONSTRATES A
      SIMPLE METHOD OF
      SORTING"
60    PRINT "IT'S CALLED A
      BUBBLE SORT—YOU'LL
      SEE WHY"
70    PRINT "PLEASE TYPE UP
      TO 1023 CHARACTERS
      TO BE SORTED"
80    PRINT "THEY CAN BE
      ANY CHARACTERS
      OTHER THAN THE
      COLON OR COMMA"
```

(Program continues on next page)

(Program continued from previous page)

```
90   INPUT A$
100  ?CHR$ (125):REM CLEAR
     SCREEN
110  POSITION 2,0
120  PRINT A$;:A=LEN(A$)
130  FOR G=1 TO A-1
140  C=0:REM FLAG
150  FOR H=1 TO A-G
160  L1=ASC(A$(H,H) )
165  REM FIND 1ST
     CHARACTER
170  L2=ASC(A$(H+1, H+1))
175  REM FIND 2ND
     CHARACTER
180  IF L1>L2 THEN GOSUB
     500
185  FOR D = 1 TO 100:NEXT D
190  NEXT H
200  IF C<>0 THEN NEXT G
210  POSITION 0,20
220  PRINT "DONE! PRESS
     RETURN TO CONTINUE";
230  INPUT A$
240  RUN
500  C=1:REM A SWITCH
     WILL BE MADE
505  REM SAVING 1ST
     CHARACTER
510  X$=A$ (H,H)
515  REM THE SWITCH
520  A$ (H,H)=A$(H+1,H+1)
530  A$(H+1,H+1)=X$
540  POSITION 2,0:? A$;
550  RETURN
```

—David Lewis

COMMODORE 64: MUSIC MATCH

This game program for the Commodore 64 uses sounds and colors to test your memory against the computer's.

The computer gives you a sequence of sounds and colors, and challenges you to remember the order. Each musical note is associated with a key (A-K) and its own color. (A=white, S=red, etc.) The computer plays a note and displays the matching color in the border of the screen. To answer, you must press the key that will produce the same color and sound.

The computer keeps going until it has built up a series of eight. If you can repeat all the notes in the right order, you win. (Don't think you can learn the sequence by playing the game over and over, because each time you play it's different.)

We had a lot of fun with this game, testing our memories and we'd do it again—if we could remember where we put our computer.

Note: The following symbols are used in the program—

‡ Means hold down SHIFT and press CLR/HOME.

§ Means hold down the Commodore key and press 8.

£ Means press the up and down CRSR key.

¿ Means press the right and left CRSR key.

```
5    PRINT "§"
10   POKE 53281,0
15   S=54272
20   FOR I=0 TO 30
25   POKE S+I,0:NEXT
30   POKE S+5,9: POKE S+6,0
35   POKE S+24,15
40   DIM HI(9), LO(9),
     KEYS$(8), SEQ(8)
45   FOR I=1 TO 9
50   READ HI(I): NEXT
55   FOR I=1 TO 9
60   READ LO (I): NEXT
65   FOR I=1 TO 8
70   READ KEYS$(I): NEXT
100  PRINT "‡";"        MUSIC
     MATCH PROGRAM"
105  PRINT "£££¿¿¿A=WHITE,
     S=RED, D=CYAN,
     F=PURPLE "
110  PRINT "¿¿¿G=GREEN,
     H=BLUE, J=YELLOW,
     K=ORANGE"
115  FOR I=1 TO 8
120  SEQ(I)=INT(8*RND(1))+1
125  NEXT
130  FOR J=1 TO 8:PRINT J
135  FOR L=1 TO J
140  I=SEQ(L):GOSUB 700
145  FOR K=1 TO 200
150  NEXT:NEXT
155  FOR L=1 TO J: GOSUB
     500
160  IF I < > SEQ(L) THEN 200
165  NEXT
170  FOR K=1 to 300
175  NEXT:NEXT
180  PRINT "‡";"     PERFECT
     SCORE!"
185  GOTO 215
200  GET A$:I=9: GOSUB 700
205  PRINT "OOPS!"
210  PRINT "‡";" YOU
     SCORED ";J-1
215  FOR K=1 TO 900
220  GET A$:NEXT
225  PRINT "                TRY
     AGAIN"
230  FOR K=1 TO 800: NEXT
235  GOTO 100
500  GET A$: IF A$="" THEN
     500
510  FOR H=1 TO 8
520  IF A$=KEYS$(H) THEN
     I=H: GOSUB 700
530  NEXT: RETURN
700  POKE S,LO(I): POKE S+1,
     HI(I)
710  POKE 53280,I
715  POKE S+4,16
```

(Program continues on next page)

(Program continued from previous page)

```
720  POKE S+4,17
725  RETURN
800  DATA 8,9,10,11,12,14,15,
     16,100
810  DATA 97,104,143,48,143,
     24,210,195,0
820  DATA "A","S","D",
     "F","G","H","J","K"
```

—Mark Sutton-Smith

TRS-80: TURING TUMULT

Computers can't think—at least, not yet. But they can do some things, like arithmetic calculations, so quickly that they seem to have incredible intelligence.

Calculating doesn't require intelligence, though—or even a computer. British mathematician Alan Turing designed a very simple mechanical machine that could imitate the most complex computer. This program, written for TRS-80 computers by 19-year-old David Lewis, creates a Turing machine that does multiplication on your TV screen.

The machine can only do five things—and all the action takes place right in front of you. It can move to the left, move to the right, erase the square it is on, or write a "1" or an "X". Even so, it *can* find the product of two numbers.

How does it do it? First it translates the two numbers you give it into strings of 1's. For example, 5 would be represented as 11111. Then it builds a string of 1's for the product, by a process that is pretty much like counting on your fingers.

To see clearly how simple the machine is, try giving it the numbers 2 and 5; then try 5 and 2. The difference in the way it handles the two problems should help you understand how it works.

```
10   CLEAR 300:CLS
20   PRINT "THIS PROGRAM
     DEMONSTRATES A"
30   PRINT "SIMPLE TURING
     MACHINE FOR"
40   PRINT
     "MULTIPLICATION. YOU
     INPUT TWO"
50   PRINT "NUMBERS AND
     IT DISPLAYS THEM"
60   PRINT "AS A STRING OF
     ONES. THEN IT"
70   PRINT "SHOWS YOU HOW
     IT FINDS THE"
80   PRINT "PRODUCT"
90   PRINT "PLEASE TYPE
     TWO NUMBERS, N1,N2"
100  INPUT "WHOSE
     PRODUCT IS LESS THAN
     18";N1,N2
110  IF N1*N2>18 THEN 90
120  CLS:PRINT@96,"X";
130  FOR NUM1=1 TO N1
140  PRINT "1";:NEXT
150  PRINT "X X";
160  FOR NUM2=1 TO N2
170  PRINT "1";:NEXT
180  PRINT "X"
190  P=1123+N1+N2:D=1
200  Q=P+32
210  POKE Q,96:Q=P+32:
     POKE Q,97
220  FOR G=1 TO 100:NEXT
230  C=PEEK(P)
240  ON D GOTO
     250,260,270,280,290,
     300,310,320,330,340,
     350,360,370,380
250  P=P-1: IF C=88 THEN
     D=2
255  GOTO 210
260  IF C=96 THEN P=P-1
     ELSE POKE P,96: D=3
265  GOTO 210
270  IF C=96 THEN P=P-1
     ELSE POKE P,96:IF C=99
     THEN D=12 ELSE D=4
275  GOTO 210
280  P=P+1:IF C=88 THEN
     D=5
285  GOTO 210
290  POKE P,96:D=6:GOTO
     210
300  P=P+1: IF C=88 THEN
     D=7
305  GOTO 210
310  IF C=96 THEN POKE
     P,113: D=8 ELSE P=P+1
315  GOTO 210
320  IF C=96 THEN
     P=P+1:D=9 ELSE
     P=P-1
325  GOTO 210
330  IF C=96 THEN P=P+1
     ELSE IF C=88 THEN
     P=P-1:D=10 ELSE 290
335  GOTO 210
340  IF C=96 THEN POKE
     P,113 ELSE P=P-1:IF
     C=88 THEN D=11
345  GOTO 210
350  IF C=96 THEN P=P-1
     ELSE POKE P,96:IF C=88
     THEN D=12 ELSE D=4
355  GOTO 210
360  IF C=96 THEN P=P+1
     ELSE POKE P,96:D=13
365  GOTO 210
370  IF C=113 THEN POKE
     P,96 ELSE P=P+1:IF
     C=88 THEN D=14
375  GOTO 210
380  IF C=96 THEN POKE
     P,88:PRINT @0, "DONE":
     END ELSE P=P+1:GOTO
     210
```

—David Lewis

(BASIC Training continues on next page)

(BASIC Training cont. from previous page)

COMPUTER TUTOR

If you don't use this program, you're never going to college, your friends will all laugh at you, and your acne will get much worse. Don't believe it? O.K., so we exaggerated a little. It must have been all those computer commercials we've seen on TV lately.

But even if it won't get you into college, this program will help you to learn just about any subject you want. Written by 16-year-old Mitch Grossbach of Planview, NY, it allows you to create a set of computerized flashcards. Then it tests you at random, and keeps track of which cards you've answered correctly. Right now, it's written for someone who wants to learn a foreign language, but you can use the same program to test yourself in any subject.

Below is a complete listing of the program for Apple and Adam computers. After that, you'll find simple instructions for adapting it to Timex-Sinclair, TI 99/4A, IBM, Commodore 64 and VIC-20.

There are plenty of refinements you can add to make this a better program. One would be a subroutine that allows you to save the lists of words on a disk, so you don't have to type them in again.

And, if you come up with a program that can cure acne, you may win yourself the Nobel Prize.

APPLE, ADAM:

```
10   REM COMPUTER TUTOR
20   REM Q=NO. OF WORDS
       TESTED
25   REM G=NO. OF GUESSES
30   REM F$=FOREIGN
       WORDS
35   REM E$=ENGLISH
       WORDS
40   REM C$=CORRECT
       ANSWERS
45   DIM E$(100),F$(100),
       C$(100)
50   HOME
55   PRINT "I AM YOUR
       COMPUTER TUTOR"
60   PRINT "I WILL TEST YOU
       IN ANY FOREIGN
       LANGUAGE"
65   PRINT "HIT RETURN TO
       BEGIN"
70   INPUT R$
80   GOSUB 500
85   REM CHOOSE TEST
90   HOME
95   Q=0:G=0
100  PRINT "1) ENGLISH
       TO   "; L$;"?"
105  PRINT "2)" ;L$;" TO
       ENGLISH?"
110  INPUT CH
115  IF CH=1 THEN GOSUB
       700
120  IF CH=2 THEN GOSUB
       900
125  PRINT "YOU'VE
       COMPLETED A ROUND"
130  PRINT "DO YOU WANT
       TO DO MORE (Y/N)";
135  INPUT Y$
140  IF Y$="Y" THEN 90
145  END
500  REM ENTER WORDS
505  HOME
510  PRINT "HOW MANY
       ENTRIES?"
515  INPUT ENT
520  PRINT "WHAT IS THE
       FOREIGN LANGUAGE?"
525  INPUT L$
530  FOR W=1 TO ENT
535  HOME
540  PRINT "ENGLISH
       WORD:";
545  INPUT E$(W)
550  PRINT L$;" WORD:";
555  INPUT F$(W)
560  NEXT W
565  W=W-1
570  RETURN
700  REM TEST 1
705  R=INT (W*RND(1))+1
710  REM TO CHECK
       PREVIOUS ANSWERS
715  FOR P=1 TO Q
720  IF F$(R)=C$(P) THEN 705
725  NEXT P
730  HOME
735  PRINT "ENGLISH
       WORD:";E$(R)
740  PRINT
       L$;"   EQUIVALENT:"
745  INPUT A$
750  IF A$=F$(R) THEN 795
755  G=G+1:IF G >2 THEN
       775
760  PRINT "WRONG—TRY
       AGAIN"
765  FOR D=1  TO 1000
770  NEXT D:GOTO 730
775  PRINT "WRONG"
780  PRINT "THE MEANING
       OF ";E$(R);"  IS   ";F$(R)
785  FOR D=1 TO 2000:
       NEXT D
790  G=0:GOTO 700
795  PRINT "CORRECT"
800  FOR D=1 to 1000:
       NEXT D
805  G=0:Q=Q+1:
       C$(Q)=F$(R)
810  IF Q=W THEN 820
815  GOTO 700
820  RETURN
900  REM TEST 2
905  R=INT(W*RND(1))+1
910  FOR P=1 TO Q
915  IF E$(R)=C$(P) THEN 905
920  NEXT P
925  HOME
930  PRINT L$;"   WORD:";
       F$(R)
935  PRINT "ENGLISH
       EQUIVALENT:"
940  INPUT A$
945  IF A$=E$(R) THEN 990
950  G=G+1: IF G>2 THEN
       970
955  PRINT "WRONG—TRY
```

(Program continues on next page)

(Program continued from previous page)

```
     AGAIN"
960  FOR D=1 TO 1000
965  NEXT D: GOTO 925
970  PRINT "WRONG"
975  PRINT "THE MEANING
     OF ";F$(R);"  IS  ";E$(R)
980  FOR D=1 TO 2000:
     NEXT D
985  G=0: GOTO 900
990  PRINT "CORRECT"
995  FOR D=1 TO 1000:
     NEXT D
1000 G=0:Q=Q+1:
     C$(Q)=E$(R)
1005 IF Q=W THEN 1015
1010 GOTO 900
1015 RETURN
```

—*Mitchell Grossbach*

TIMEX SINCLAIR 1000 (with 16K) OR 1500: Delete lines **45**, **95**, **140**, **145**, **565**, **705**, **720**, **750**, **755**, **790**, **805**, **810**, **905**, **915**, **945**, **950**, **985**, **1000**. Then add these lines:

```
41   RAND 0
45   DIM E$(100)
46   DIM F$(100)
47   DIM C$(100)
95   LET Q=0
96   LET G=0
140  IF Y$="Y" THEN GOTO 90
145  STOP
565  LET W=W-1
705  LET R=INT(W*RND)+1
720  IF F$(R)=C$(P) THEN
     GOTO 705
750  IF A$=F$(R) THEN GOTO
     795
755  LET G=G+1
756  IF G>2 THEN GOTO 775
790  LET G=0
791  GOTO 700
805  LET G=0
806  LET Q=Q+1
807  LET C$(Q)=F$(R)
810  IF Q=W THEN GOTO 820
905  LET R=INT (W*RND)+1
915  IF E$(R)=C$(P) THEN
     GOTO 905
945  IF A$=E$(R) THEN GOTO
     990
950  LET G=G+1
951  IF G>2 THEN GOTO 970
985  LET G=0
986  GOTO 900
1000 LET G=0
1001 LET Q=Q+1
1002 LET C$(Q)=E$(R)
1005 IF Q=W THEN GOTO 1015
```

Change every statement that reads **HOME** to **CLS**.

Break all remaining multiple statement lines into single statement lines.

IBM PC AND PC JR.:
Delete lines **705** and **905**.

Then add these lines:

```
41   RANDOMIZE
705  R=INT(RND*(W+1))
905  R=INT(RND*(W+1))
```

Replace all **HOME** statements with **CLS**.

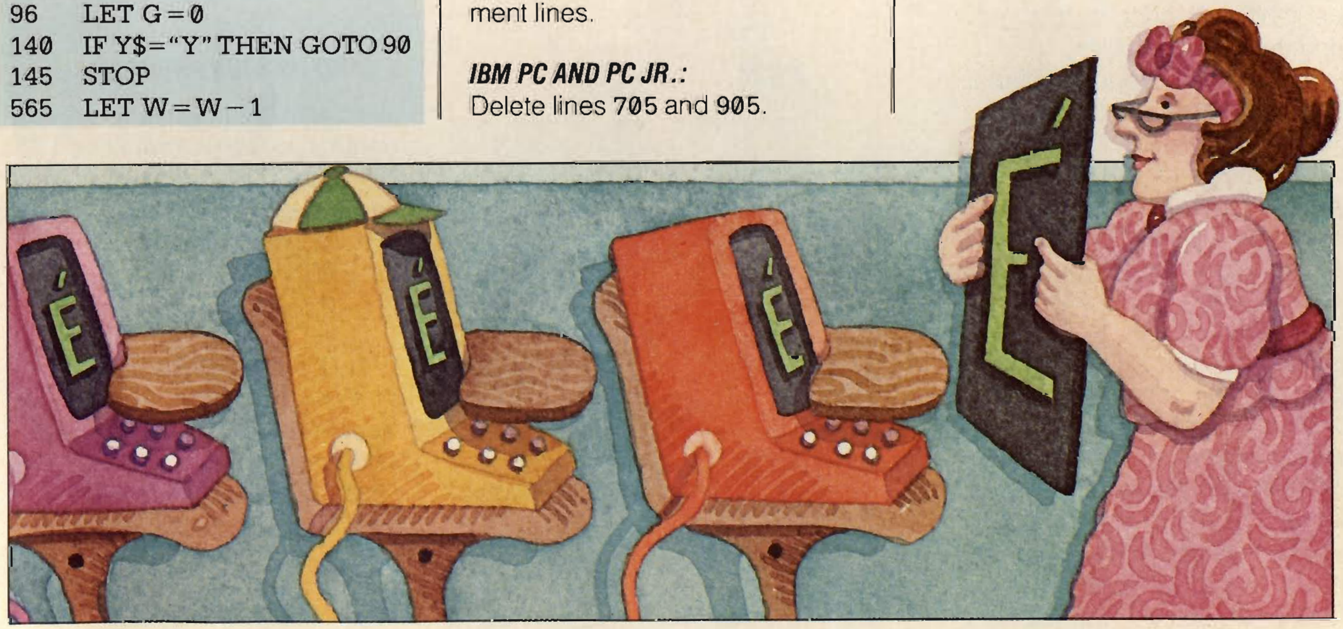
COMMODORE 64 AND VIC 20:
Replace all **HOME** statements with **PRINT CHR$(147)**

TI/994A: Delete lines **115**, **120**, **705**, and **905**. Then add these lines:

```
41   RANDOMIZE
115  IF CH<>1 THEN 120
116  GOSUB 700
120  IF CH<>2 THEN 125
121  GOSUB 900
705  R=INT(W*RND)+1
905  R=INT(W* RND)+1
```

Replace all **HOME** statements with **CALL CLEAR**. If you don't have extended BASIC, multiple statement lines must be broken up into single statement lines.

(BASIC Training continues on next page)



(BASIC Training cont. from previous page)

ATARI: LINE DESIGN

Here's a graphics program for Atari computers written by 17-year-old Derrick Deidrick of Sheffield, Ohio. It draws an endless series of geometric designs on your TV or monitor. It's simple, but it's a lot of fun to watch. Just leave it running and let your friends wonder what it's doing.

```
10  GR.8+16
20  A = 319*RND(0):
    X = 319*RND(0)
30  B = 191*RND(0):
    Y = 191*RND(0)
40  C = INT(14*RND(0)+2)
50  FOR J = 1 TO 40
55  D = INT(8*RND(0))+1
60  T = 5+INT(60*RND(0))
65  FOR I = 1 TO T
70  ON D GOSUB 240,
    250,260,270,280,
    290,300,310
75  SE.2,C,0:COLOR 3
80  IFX< 0 THEN X = 319
85  IFA< 0 THEN A = 319
90  IFB< 0 THEN B = 191
95  IFY< 0 THEN Y = 191
100 IFA> 319 THEN A = 0
105 IFX> 319 THEN X = 0
110 IFB> 191 THEN B = 0
115 IFY> 191 THEN Y = 0
120 PLOT A,B:PLOT 319-A,B
125 PLOT 319-A,191-B
130 PLOT A,191-B: PLOT X, Y
135 PLOT 319-X,Y
140 PLOT 319-X,191-Y
145 PLOT X,191-Y
150 NEXT I:NEXT J
155 FOR W = 1 TO 400
160 NEXT W:GOTO 10
240 A = A-1:X = X+1
250 B = B+1:Y = Y-1:
    RETURN
260 B = B-1:Y = Y+1
270 A= A+1:X = X-1:
    RETURN
280 A = A-1:X = X-1
290 B = B-1:Y = Y-1:
    RETURN
300 B = B+1:Y = Y+1
310 A = A+1: X =X+1:
    RETURN
```

—Derrick Deidrick

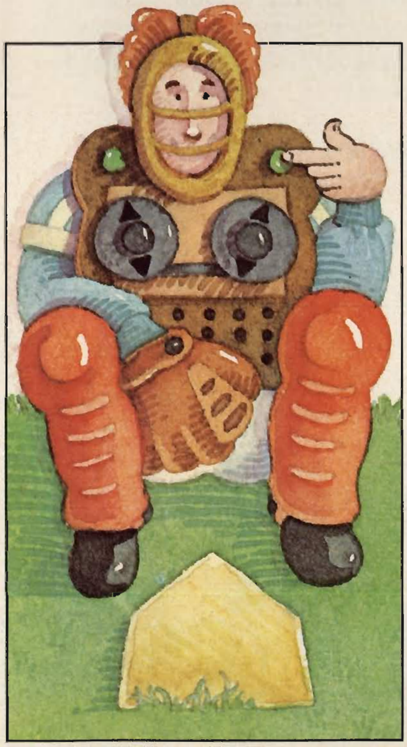
CHALLENGE #4: PLAY BALL!

Springtime brings to mind the Easter Parade, April showers, May flowers and plans for summer vacation. But for some of us, the beginning of spring means just one thing—baseball!

Just by coincidence, baseball is the topic of this month's BASIC Training Challenge. Does this mean we expect you to write a program that will turn your computer into a great shortstop? Not exactly. We just want you to dream up a program that has some kind of baseball theme.

For a real fan, that might be a program that computes and keeps track of league standings, batting averages and other statistics. (See "Rate the Greats" in this issue.) Or, it might be a baseball trivia quiz. If you're a graphics designer, you might try to create a scoreboard fireworks display on your screen.

Whatever you come up with, we'd like to see it. Send your finished program to: Challenge #4, ENTER, CTW, 1 Lincoln Plaza, New York, NY 10023. We'll pick our favorites and print them in a future issue. If we print yours, we'll send you $50 and an ENTER T-shirt.



Remember to include a note telling us your name, age, address, the type of computer your program is written for, and your T-shirt size. Also, remember that our space is limited: keep your program under 100 lines.

SEND US YOUR PROGRAMS!

We'd also like to see any other programs you've written. Send them to BASIC Training at the address above. If we print one of yours, we'll also send you $50 and an ENTER T-shirt.

CORRECTIONS

In the March 1984 issue, the "Self-Portrait" Program for the IBM PC contained an error on line **90**. The line should have read:

```
90 PRINT: INPUT "Are you
happy, sad, or angry?";M$
```

In "Video Valentine" for the TI 99/4A, line 140 should read:

```
140 PRINT TAB(13); "DAY"
```

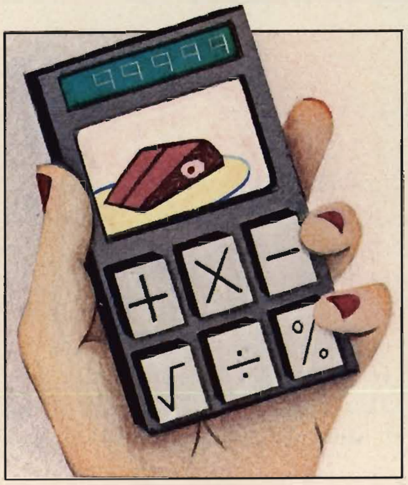
(Continued from page 7)

LO-CAL HI-TECH

First came the one-calorie soft drink—now there's the Fitness-3 Calorie Computer. It's a pocket calculator designed to make dieting just a little easier.

Enter the number of calories you eat each day into the Fitness-3 Calorie Computer. Then enter the number of calories you burn off. The computer keeps track of both figures and, with the push of a button, computes your net calorie gain or loss. If you've gone over your goal, the surplus calories are carried over to the next day's count. If you've managed to keep under your goal, you might want to reward yourself with a piece of cake.

So, if too many *bites* are turning you into a blimp, why not put a little *byte* into your diet?


© SETH JABEN

■ ■ ■

COMPUTER-HATERS UNITE

After a tough day at the computer, some users would be happy to see an elephant squash their machine, a boxer pulverize it, or a tribe sacrifice it. Unfriendly users can view all these scenes in *The Unofficial I Hate Computers Book*, by Rich Tennant and John Barry, a cartoon collection that pokes fun at the marvelous microchip.

There's even a "draw-it-yourself" cartoon contest encouraging readers to submit their own computer cartoons. Judges will select five cartoons to appear in the second edition. It's a way to get even with a cantankerous computer. ⊡

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COMPUTER-AGE TV

BY LEN HILTS

You are watching a parade on TV. The camera is looking down from a tall building, but you want a closer look at the next float. You reach for the remote control box and touch a button. Suddenly the camera zooms in and the float looms large on the screen. You're seeing just what you wanted to see.

Did you take control of the television station? No, you just discovered one of the many feats possible with a new kind of television—digital TV.

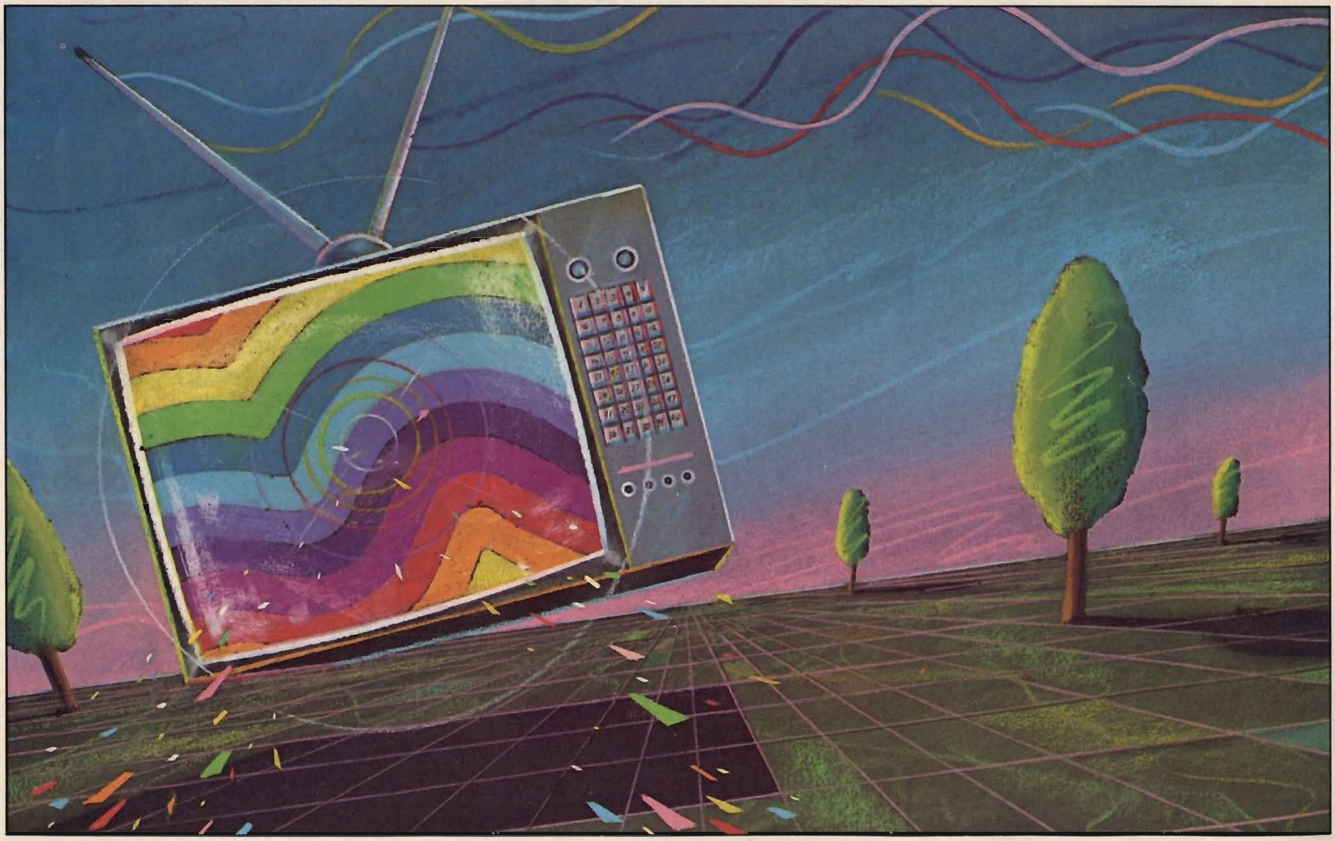
Using technology similar to that in a computer, digital television will provide the clearest, sharpest TV picture anyone has ever seen. It will let you zoom in on a scene, freeze a picture on the screen, and perhaps even allow you to split the screen and watch more than one station at a time. And because its technology is so similar to that used by computers, digital TVs can serve as high-resolution monitors that won't need a converter to hook up with home computers.

TV's Third Age

Digital TV marks the beginning of television's third age. First came black-and-white TV. Next was the age of color. Digital television is color TV with a difference.

Today's first- and second-age TVs use an *analog* (continuous) system. Signals are sent out by television stations in continuous waves. These waves, which travel parallel to the ground on the way to your antenna, can be distorted by storms, buildings, aircraft and other obstructions.

Even if the analog signal



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reaches your antenna without too much distortion, it must still be processed through your set. This processing separates the signal into the parts that carry sound, color and brightness. The separation is not easy, and seldom clean and sharp. Thus, even the best first- and second-age TV picture suffers some distortions—including ghosts, flickers, odd colors and flecks of light.

Digital TV will avoid distortions by using numbers instead of analog waves to produce picture and sound. The digital system in a TV will work in much the same way as the digital system in a computer does. A TV signal containing sound and picture data will be transmitted in binary code as a set of 0's and 1's. Each piece of binary code will describe a tiny part of the picture—a picture element or "pixel." When the digital TV receives this signal, it reconstructs the picture, pixel by pixel.

This binary code will be difficult to distort and very easy to process into sharp sound and pictures. The code can also be manipulated to create zoom, freeze and other similar special effects.

This binary-coded signal will be processed in the digital TV set by seven VLSI (Very Large Scale Integration) chips. These chips, engineers say, will do the work of 300,000 transistors and replace about 350 parts found in present-day TV sets.

How Digital TV Can Work Today

The perfect digital television system will take a digital signal and process it through a digital TV set. However, not one TV station today is sending digital signals. Experts predict it may take five to ten years before most stations do transmit digital, rather than analog, signals.

But, even when processing analog signals, digital TV sets are expected to produce improved pictures.

Digital TV marks the dawn of television's third age—the computer era.

In a small way, the age of digital TV has already begun. "Many sets already use digital signals to handle channel selection and remote control," says Carl Michelotti, vice president for color TV engineering at Zenith. "The change to digital will be an evolution over the next five to 10 years."

Digital TV sets are already being sold in Germany. They should be available in the U.S. later this year. These first digital sets will be expensive, top-of-the-line models. Within the next few years, even the less expensive sets are expected to go digital. In the long run, digital technology should lower television set production costs. This will be possible because the VLSI chips used in digital sets will replace more than 300 existing television parts. The chips will cost only about $30 to $40 per set.

When the first sets are installed, the system will work like this: the digital set will take analog television waves and translate them into binary code. In that form, the VLSI chips will process the signals, get rid of ghosts and other distortions, and check for color, sound and picture quality. This cleaned-up signal will then be converted back to analog form and shown on the TV screen.

When a large number of digital sets have been sold, TV stations will convert their transmitters from analog to digital. This will eliminate the need to translate signals from analog to digital and back again. With a digital set processing a digital signal, the improvement in picture quality is expected to be even more striking.

Digital Future

But while the first digital TV pictures may seem very sharp, future developments are likely to add even more to the scene.

At the moment, for example, a TV picture is made up of 525 lines across the screen. Developments in digital TV systems will make it possible to put another line between each of these, bringing the total well above 1,000. This will help create an even sharper high-resolution picture.

In addition, digital technology may make it possible to develop two-way (interactive) TV on a large scale.

One thing is certain: with digital technology, you'll end up seeing details on the screen you didn't even *know* were there. ⊟

LEN HILTS lives in Chicago and writes about technology.

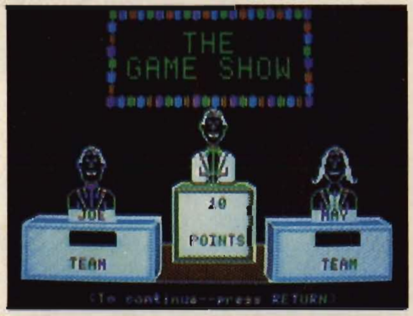
(Continued from page 9)

years old. It would be nice to see it redone today. They would improve the graphics and maybe add some sound effects. When I'm asked to find Rhode Island, I can't even see it because the map is a bit small.

PHIL: That's how you know it's Rhode Island.

THE GAME SHOW

(Computer Advanced Ideas; Apple II, 48Kdisk;$39.95)



"The TV game show format is a good way of playing with information."—Bernie

"And the fact that you can create your own game files makes it even more attractive."—Phil

Basically, this is the old television game show of *Password*, in which you guess a word based on clues given by a partner. Only in this version, your partner is the computer.

The game itself is for two teams and is very good. A computer-graphic animated mouth moves, words appear in the cartoon-balloon, and you get the feeling that the computerized character is talking. Although the built-in vocabulary is tough, it's fun to see how far you can get against the computer—then you can start your own word lists.

WRAP-UP

PHIL: I love the fact that you can play this with other people or all alone.

BERNIE: It's really a game for all ages.

HIGH RISE

(Microlearn; Atari, Apple, Commodore 64, and IBM PC; $30.00)

"If there is a problem with the game, it is that gravity doesn't affect action like it would in real life."—Phil

"Sometimes you swear the blocks should come tumbling down, but they don't."—Bernie

This is a game of building towers from a large assortment of multi-colored blocks. Five bins on screen contain the block shapes your character can use. The object is to select blocks, position them on a springboard, send them onto the stack, and hope that everything remains stable. If you send a block to the wrong place, your whole stack comes tumbling down.

When your stack reaches a certain height without falling over, your character automatically climbs to the next more difficult level. It may sound like child's play, but *High Rise* is fun.

WRAP-UP

BERNIE: The graphics are low resolution, but that doesn't seem to interfere with the challenge. I think *High Rise* is remarkable, one of the best "educational games" I've ever played.

PHIL: My criticism is that you can only use the keyboard. No joysticks allowed. Ugh!

MUSIC CONSTRUCTION SET

(Electronic Arts; Apple II, Commodore 64, and Atari computers; $40)

SONGWRITER

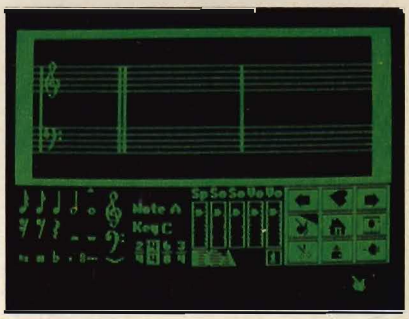
(Scarborough Systems; Apple II+ or IIe, Commodore 64, IBM-PC, and Atari computers; $40)

FUN WITH MUSIC

(Epyx; VIC-20 and Atari computers; $40)

"I enjoy synthesizing music on the computer. The program teaches me something I want to learn—how to write music."—Phil

"But I want the software to be very friendly. It has to let me play right away."—Bernie



These three programs can all make you a computer composer—but they each go about this in different ways, and at different levels.

Music Construction Set provides symbols to help you control what you do. For example, to hear your composition, you position the little hand over the piano symbol. To correct a mistake, you use the scissors. (This easy-to-follow notation was pioneered by Bill Budge in his hit of 1983, *Pinball Construction Set.*)

This kit gives you access to a whole variety of musical notation. The more you know about music, the more you can appreciate this software and make great sounds.

Songwriter, on the other hand, is for the novice. The screen uses a player-piano roll visual, which is simple to use. This software lets you enhance your composition by controlling speed of playback and other factors.

Fun with Music is the least impressive, and most limiting, of these three programs. You can only have about 200 notes in a composition *(Music Construction Set* gives you 700). And you can't store your creations without a tape or disk drive, something most VIC-20 owners do not have.

WRAP-UP

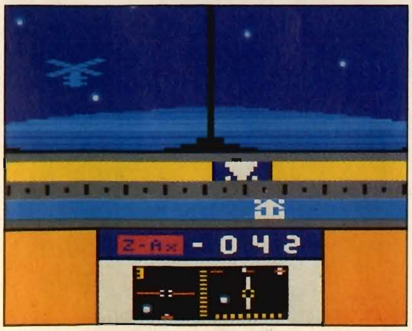
BERNIE: I liked *Songwriter* best, because I felt it was the easiest to understand. The visuals helped me, and I was delighted with the length of my compositions.

PHIL: I felt *Music Construction Set* was best, because it is a tool kit of real musical notation and composition.

◆◆◆

SPACE SHUTTLE

(Activision; VCS; $34.95)



"I love it. This is a thinking player's game with little hand/eye coordination required." —Phil

"That's what I didn't like. I wanted to feel like I was flying the shuttle." —Bernie

Space Shuttle is, in many ways, a computer simulation. These games are devoted to an accurate reproduction of a complex, real-life event.

The object of *Space Shuttle* is to rendezvous your shuttle with an orbiting satellite. You do it in six stages: launch, establishing orbit, docking, re-entry burn, re-entry to Earth's atmosphere, and landing the shuttle.

The joystick is used to maneuver the shuttle. But most of the game strategy involved making calculations and pushing switches. You have to keep your eye on all kinds of dials, and constantly make mid-course corrections.

Two overlays are used. One slips over all the switches, changing their functions so you can open and close the cargo bay doors. The second overlay is what real shuttle astronauts call a "cheat sheet." It contains information about how to fly the shuttle. A training and intermediate flight are included in case the real flight is too overwhelming.

WRAP-UP

PHIL: I think this unique cartridge makes great use of the VCS, giving people who own that machine access to a stimulating challenge. The graphics are great, sound is good, and you learn something about the operation of the real space shuttle.

BERNIE: But it's not fun. I wanted to feel like I was flying the shuttle through space. I think the result is an experience that seems real, but isn't enjoyable.

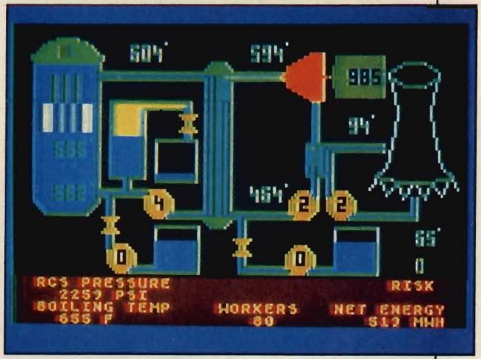
◆◆◆

SCRAM

(Atari; Atari computers; cassette; $24.95)

"'Scram,' like 'Space Shuttle,' is not fun."—Bernie

"I disagree. Sure, 'Scram' is not fast-paced like 'Pac-Man', but it's good."—Phil



Scram is perhaps less of a game than anything else in this column. It puts you in control of a nuclear power reactor. You must constantly monitor and adjust instruments, trying to prevent either a melt down or a shut down. A lengthy rule book is included, with more information on the history and workings of nuclear power in the U.S. than on how to play the "game."

Most of the player's actions consist of finding and solving problems as they occur—a kind of juggling act of all the variables. The risk factor increases as the player's skill increases. Just when you think *Scram* is easy, it gets tougher.

WRAP-UP

PHIL: If you buy this game to learn about nuclear reactors, you'll get your money's worth and then some.

BERNIE: But if you're buying it to have fun, you're going to be disappointed.

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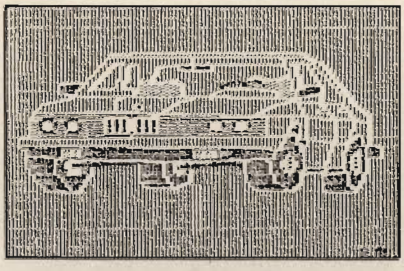
FEEDBACK

(Continued from page 3)

PICTURE THIS

I have been reading articles about the KoalaPad since August. And I have been bugging my dad to get me one, but he wouldn't—until he read the article about drawing pads in your Dec./Jan. '84 issue. He was really impressed, and so was I. On Christmas Day, I was happy to see that Santa had gotten me a KoalaPad. I'm sending you some pictures I have done in my first two days with the KoalaPad.



—Jeff Wild, 13
Cincinnati, OH

MACINTOSH SCOOP

I would like to know if you could run an article on the Apple Macintosh.

—Heath Rackley
Layton, UT

Dear Heath:

No sooner said than done. Check out "News Beat" for Susan Myers' report on the Macintosh computer. And we'll have an in-depth review soon. —Ed.

MAKING MOVIES

In your March 1984 issue, you answered Susan Seyboldt's letter by saying that you just used the "Computers: Movie Makers of the Future" issue as an advertising technique. I thought that, rather than it not existing, you might want to use the idea for a future issue! I hope you consider this idea.

—Michael Dumas
Washington, MI

Dear Michael:

We have given your idea a great deal of careful thought and have concluded: you are absolutely right! Computers making movies is a great idea for a story. Details are pending, but watch for the July/August '84 issue of ENTER. We'll have a story about a super-computer that's helping to create whole scenes of the new movie "The Last Starfighter" from Universal. —Ed.

JOGGING MEMORY

My first issue of ENTER was great. I enjoyed the "Jogging Poem Program." My friends and I are already making new poems for it.

I have a Commodore 64 computer and I would like to see more programs like "Boxy" or something like it.

—Peter Vescera
Metuchen, NJ

WRITE TO US!

We'd like to hear from you. Your ideas, questions and criticisms will help us make ENTER a better magazine. Send your letters to:

FEEDBACK
ENTER Magazine/CTW
1 Lincoln Plaza
New York, NY 10023

INPUT

ENTER POLL #4

We'd like to know about your experience with computers, and what you think of some of the articles in this month's ENTER. Your answers help us plan future issues, so please be honest. We'll send ENTER t-shirts to 50 of you, picked at random.

Mail your questionnaire by May 15 to: ***INPUT #4, ENTER Magazine, P.O. Box 777, Ridgefield, N.J. 07657***

I. Tell us about yourself:

Name ____

Address ____

City ____ State & Zip ____

Grade ____ Age ____ Male ____ Female ____

T-shirt size Kids L ____ Adult S ____ M ____ L ____

Where did you get this issue of ENTER?

____ In the mail ____ At a computer store ____ At a bookstore or newsstand ____ Other (explain) ____

II. We'd like to know about you and computers:

A. Does your family own a computer? ____ Yes ____ No

B. Which kind? (Check as many as apply) ____ Apple ____ Atari ____ IBM ____ Commodore 64 ____ VIC 20 ____ Timex/Sinclair (which model?) ____ ____ TI 99/4A ____ Other (Please indicate name and model) ____

C. What peripherals does your family own? (Check all that apply) ____ Disk drive ____ Joysticks ____ Printer ____ Cassette Drive ____ Modem ____ Koala pad ____ Chalkboard ____ Other (explain) ____

____

D. We'd like to know what you do with your computer. Do you:

1. Create graphics? ____ Yes ____ No
2. Write original programs? ____ Yes ____ No
3. Do your homework? ____ Yes ____ No
4. Do word processing? ____ Yes ____ No. If yes, which program do you use? ____
5. Play games? ____ Yes ____ No
6. If you write your own programs, what language do you use? ____ Logo ____ BASIC ____ Pascal ____ Other (which one?) ____

III. Tell us what you think about this issue's articles.

A. Did you read the story on MAKING MONEY with your computer? ____ Yes ____ No. If yes, what did you think of it? ____ Liked it ____ OK ____ Didn't like it

1. Have you ever used your computer skills to make money? ____ Yes ____ No. If yes, what did you do?

____

2. Do you have any plans to use your computer this summer to make money? ____ Yes ____ No. If yes, how? ____

____

B. Did you read THE DIARY OF A GAME DESIGNER? ____ Yes ____ No. If yes, what did you think? ____ Liked it ____ OK ____ Didn't like it

1. Have you ever tried to program a game on your computer? ____ Yes ____ No. Do you know anyone who did? ____ Yes ____ No

2. Have you ever approached a company with your idea? ____ Yes ____ No. What happened? ____

____

C. What did you think of our NEWS SECTIONS?

	Liked it	OK	Didn't like it
Newsbeat	____	____	____
Showbeat	____	____	____
Pacesetters	____	____	____
Connections	____	____	____

D. Last, but not least: In future issues of ENTER, I'd like to read about ____

____

NEXT

COMING IN JUNE

ROBOTS...ROBOTS...ROBOTS: The robots are coming home. An interview with robot inventor Hans Moravec and a look at what life's like with a robot around the house. Plus, a robot hall of fame and a way for you to win your own home robot.

VIDEO DEEJAY: Merrill Aldighieri uses all kinds of high-tech tricks to help create some of today's hottest music videos.

COOKIN' WITH THE KITCHENS: How did three brothers all become game designers. Find out how Steve, Garry and Dan Kitchen grew up to create great games like *Space Shuttle* and *Keystone Kapers*.

HARDWARE REVIEW: *PCjr.* An in-depth, hands-on review of the latest computer from IBM. What happens when this giant company creates a small home computer?

SOFTWARE REVIEW: A close-up look at *Movie Maker*, an innovative software tool that lets you create animation without a lot of programming.

PLUS: Hot news in *Show Beat*, *News Beat* and *Pacesetters*. News-you-can-use in *Connections*... Programming for nine different computers.

ANSWERS

COMPUTER SCRAMBLE *(page 50)*

1. **SAVE**
2. **RUN**
3. **RETURN**
4. **DISK**
5. **BOARD**
6. **BUS**
7. **LIST**
8. **EPROM**
9. **FLOW**
10. **OPEN**
11. **RESET**
12. **SECTOR**
13. **READ**
14. **POINTER**

MEANDERING FLOWCHART *(page 44)*

Y, N, N, Y, N, N, N,
N, N, Y, Y, Y, Y, Y

GAME SEARCH *(page 46)*

E	C	R	I	T	I	C	A	L	M	A	S	S	N	W	H
T	R	E	P	Y	T	R	E	T	S	A	M	E	A	R	T
R	D	I	S	H	A	M	U	S	E	I	W	R	R	O	D
A	T	H	F	E	C	O	O	P	N	W	I	P	E	C	N
N	M	R	R	S	Y	P	U	A	O	T	Z	E	N	K	O
S	T	E	A	A	S	E	R	R	Z	E	A	N	N	Y	H
Y	S	T	W	A	Y	O	L	S	E	H	R	T	U	S	C
L	N	F	T	E	I	D	R	E	M	C	D	S	R	B	R
V	A	I	O	T	K	E	T	C	I	O	R	S	E	O	A
A	M	L	B	A	R	A	O	T	T	C	Y	T	D	O	H
N	E	P	O	S	O	D	E	F	L	I	O	A	O	T	P
I	I	O	R	N	Z	L	P	Y	D	R	I	R	L	S	S
A	P	H	L	E	G	I	O	N	N	A	I	R	E	K	L
E	E	C	A	P	S	N	I	S	D	U	R	G	T	S	G
O	F	S	O	C	C	E	R	X	A	M	E	U	L	B	O
R	A	D	R	S	N	O	R	A	B	L	I	O	I	V	E

WHAT DID THE COMPUTER SAY TO THE FLOPPY DISK?
LET'S GO FOR A DRIVE!

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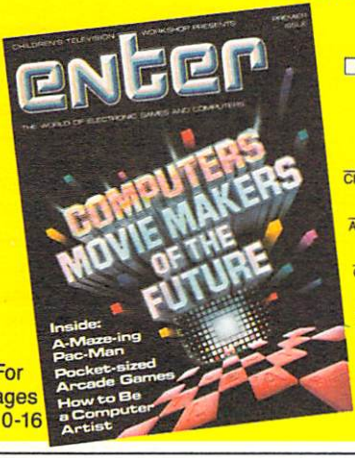
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